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FORMERLY The BULLETIN

THE SCIENTIFIC TRADITION IN FRENCH HOSPITAL PHARMACY

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American Society of Hospital Pharmacists

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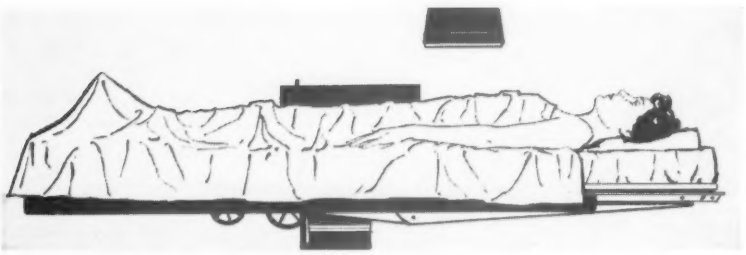

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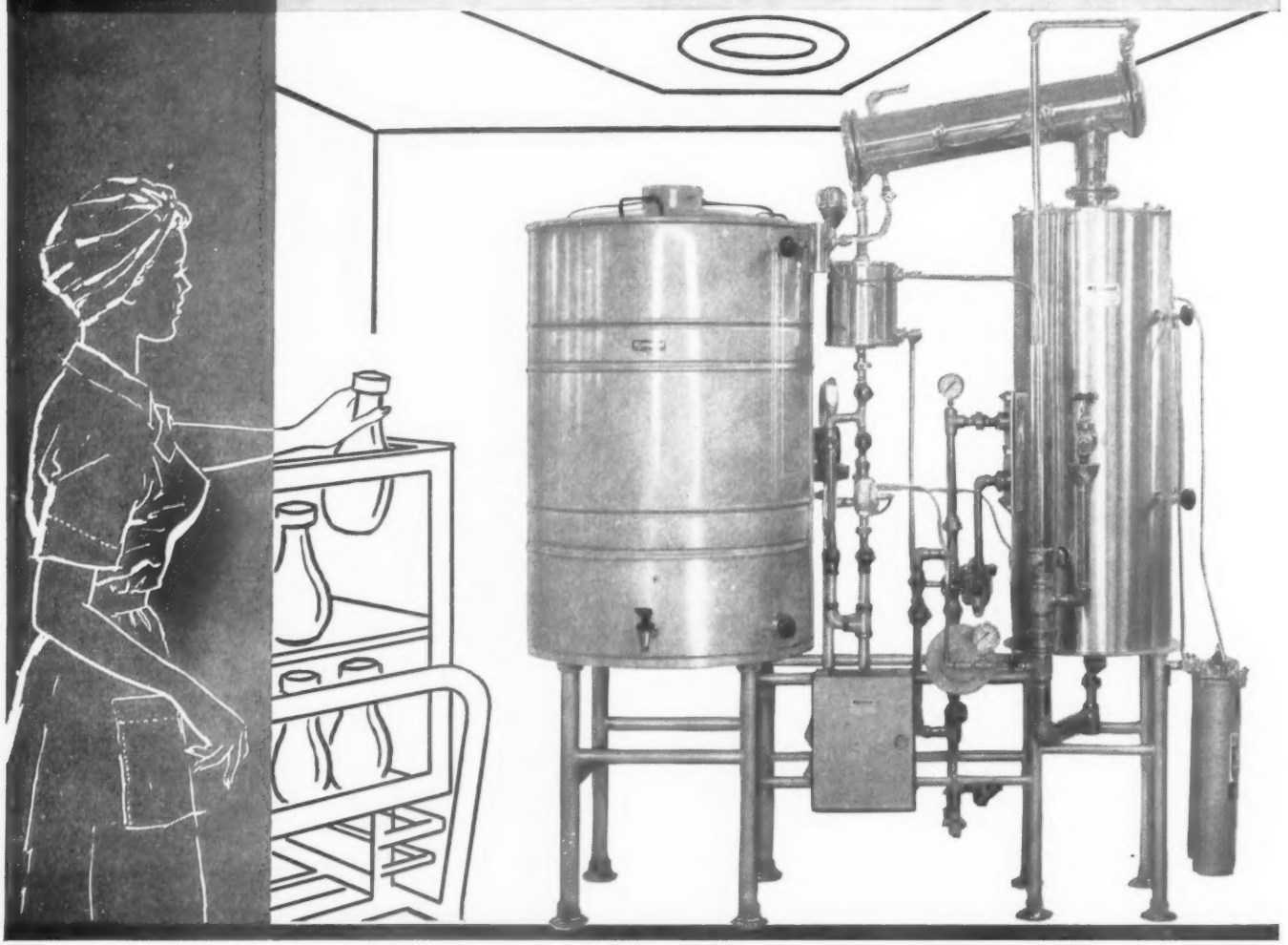

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Barnstead Ultra-Violet equipment (a) protects distilled water against bacteria for at least 30 days and (b) kills bacteria introduced into tank. The Barnstead Ventgard filters out all airborne impurities down to 0.2 micron . . . and removes all types of bacteria and particles as well as carbon dioxide and other gases.

purity protected in storage
greater storage capacity

DISTILLED WATER ALWAYS ON TAP

New Barnstead fully automatic Still continuously replenishes pure water supply 24 hours a day without attention. Even though distilled water supply is depleted at day's end, the storage tank is filled again automatically before the beginning of the next day with sterile, pyrogen free distilled water. Thus hospitals have ample supply of distilled water even during peak use periods.

Write for Bulletin #162 describing Barnstead's new and better way to produce and store distilled water.

Barnstead®
STILL AND STERILIZER CO.
37 Lanesville Terrace, Boston 31, Mass.

Your surgical convalescent feels better because he is better with

Durabolin®

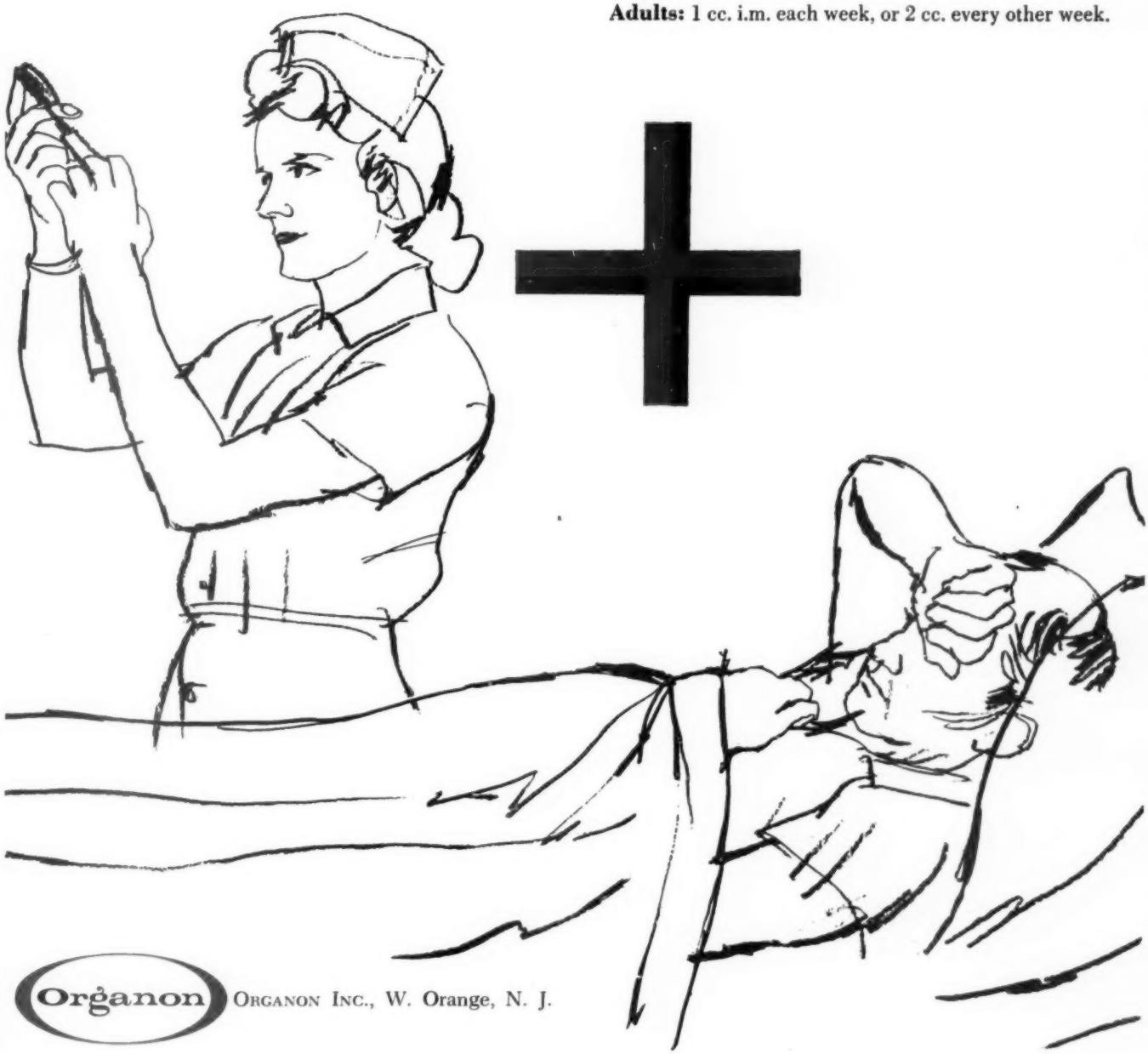
(Nandrolone phenpropionate injection, ORGANON)

1 cc. once each week

for safe potent anabolic stimulation
+ to maintain positive nitrogen balance
+ to promote rapid wound healing
+ to restore appetite, strength, vitality
+ to shorten convalescence, save nursing time
+ to reduce the cost of recovery

Supplied: 1-cc. ampuls (box of three) and 5-cc. vials, 25 mg. nandrolone phenpropionate/cc.

Adults: 1 cc. i.m. each week, or 2 cc. every other week.



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IMPROVED EFFICIENCY AND PATIENT CARE

Hospitals seek improved efficiency, better patient care, decreased operating expenses, and increased net revenue. These goals can and have been achieved in a major aspect of hospital operations—use of injectables—through the TUBEX closed injection system.

The TUBEX system consists of a durable, breech-loading syringe and presharpened, presterilized needle and glass cartridge units containing premeasured doses of medication. After loading the syringe, and injecting, the cartridge-needle unit is discarded. As much as 70% of commonly used injectables are available in TUBEX form. Additional flexibility is provided by empty sterile cartridge needle units.

The TUBEX system provides benefits for business office, nurses, pharmacists, and physicians.

TUBEX®

Closed Injection System, Wyeth

TUBEX®, *Hypodermic Syringe, Wyeth*
TUBEX®, *Sterile Cartridge-Needle Unit, Wyeth*

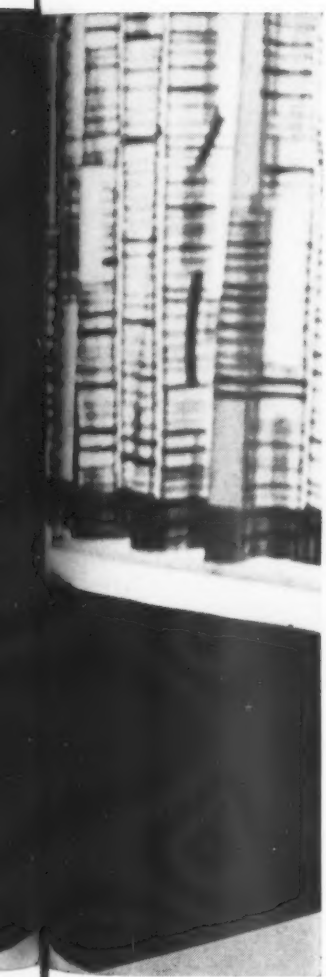
Wyeth Laboratories Philadelphia 1, Pa.

Wyeth®

ADMINISTRATORS LIKE TUBEX. The TUBEX system means more accurate accounting and billing. Only one purchase entry required as there are no multidoses to divide. A single purchase order for cartridges simplifies buying. Inventory control is easier; medication is ordered, dispensed and accounted for in multiples of single doses. Because exact amount of medication is always known, billing to patients is more accurate.

PHARMACISTS LIKE TUBEX. Easier, more convenient storage of TUBEX units recommends this system over the usual ampuls and multidose vials. Clear labeling and accurate inventorying of single-dose units result in more efficient filling of prescriptions and less chance for error; tamper-proof cartridges discourage narcotics pilferage.

NURSES LIKE TUBEX. No time is lost in assembling syringes, sponging vials, measuring doses, rinsing syringes and needles. No clean-up problem: cartridge and needle are discarded after injection. The familiar frustrations, syringe breakage and plugged needles, are almost impossible with TUBEX. An added benefit: no multidoses to divide, no drugs spilled and no contact sensitization. Patients appreciate the relatively painless sharp, new needles.



M.D.'s LIKE TUBEX. Accurate dosage and asepsis are major benefits. Each presterilized needle-unit contains premeasured amount of medication. The TUBEX sterile cartridge-needle unit is used but once and cannot transmit cross infections (serum hepatitis).

NEW MEMBERS

. . . . . .

The following ASHP members sponsored the New Members listed in this issue of the JOURNAL. *The officers of the* SOCIETY *and the Committee on Membership and Organization appreciate the efforts of the individuals who have encouraged New Members to join the national organizations.*

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1961 ASHP ANNUAL MEETING

Schedule of Events

- Executive Committee—Saturday, April 22, 9:00 A.M.
- Executive Committee—Sunday, April 23, 9:00 A.M.
- Committee on Resolutions—Sunday, April 23, 9:00 A.M.
- House of Delegates—Sunday, April 23, 2:00 P.M.
- Reception for Dr. Svend Aage Schou—Sunday, April 23, 5:30 P.M.
- Committee on Resolutions—Monday, April 24, 9:00 A.M.
- First General Session—Monday, April 24, 1:30 P.M.
- Second Session — Tuesday, April 25, 9:00 A.M.
- Third Session—Tuesday, April 25, 1:30 P.M.
- H.A.K. Whitney Award Reception—Tuesday, April 25, 7:00 P.M.
- H.A.K. Whitney Award Lecture Award Dinner—Tuesday, April 25, 8:00 P.M.
- Committee on Resolutions — Wednesday, April 26, 9:00 A.M.
- ASHP Breakfast — Thursday, April 27, 8:00 A.M.
- Fourth (Final) Session—Thursday, April 27, 9:30 A.M.

All meetings will be held at Hotel Sherman, Chicago.

ANNOUNCING—
SPECIFICALLY FOR
INFECTIONS DUE TO
"RESISTANT" STAPHYLOCOCCI

AN ENTIRELY NEW SYNTHETIC
"STAPH-CIDAL" PENICILLIN

Staphcillin™

sodium dimethoxyphenyl penicillin
FOR INJECTION

UNIQUE—BECAUSE IT
RETAINS ANTIBACTERIAL
ACTIVITY IN THE PRESENCE OF
STAPHYLOCOCCAL PENICILLINASES
WHICH INACTIVATE
OTHER PENICILLINS

Bristol™

NEW SYNTHETIC PENICILLIN FOR "RESISTANT" STAPH

MICROBIOLOGICAL AND PHARMACOLOGICAL PROPERTIES

In vitro studies show that STAPHCILLIN is a bactericidal penicillin with activity against staphylococci resistant to penicillin G. Strains of staphylococci so far tested have been sensitive to STAPHCILLIN *in vitro* at concentrations of 1-6 mcg. per ml. These levels are readily attained in the blood and tissues by administration of STAPHCILLIN at the recommended dosage. This unique attribute is probably due to the fact that STAPHCILLIN is stable in the presence of staphylococcal penicillinase. STAPHCILLIN also resists degradation by *B. cereus* penicillinase. The antimicrobial spectrum of STAPHCILLIN with regard to other microorganisms is qualitatively similar to that of penicillin G; but considerably higher concentrations of STAPHCILLIN are required for bactericidal activity than is the case with penicillin G.

STAPHCILLIN is rapidly absorbed after intramuscular injection. Peak blood levels (6-10 mcg./ml. on the average after a 1.0 Gm. dose) are attained within 1 hour; and then progressively decline to less than 1 mcg. over a 4 to 6 hour period. It is poorly absorbed from the gastrointestinal tract. STAPHCILLIN is rapidly excreted by the kidney.

As shown by animal studies, STAPHCILLIN is readily distributed in body tissues after intramuscular injection. Of the tissues studied, highest concentrations are reached in the kidney, liver, heart and lung in that order; the spleen and muscles show lower concentrations of the antibiotic. STAPHCILLIN diffuses into human pleural and prostatic fluids, but its diffusion into the spinal fluid has not yet been completely studied. However, one patient with meningitis showed a significant concentration in his spinal fluid while on STAPHCILLIN therapy.

Toxicity studies with STAPHCILLIN and penicillin G in animals show that they have approximately the same low order of toxicity.

Certain staphylococci can be made resistant to STAPHCILLIN in the laboratory, but this resistance is not related to their penicillinase production. During the clinical trials, no STAPHCILLIN-resistant strains of staphylococci were observed or developed; the possibility of the emergence of such strains in the clinical setting awaits further observation.

PRECAUTIONS

During the clinical trials, several mild skin reactions, e.g., itching, papular eruption and erythema were observed both during and after discontinuance of STAPHCILLIN therapy. Patients with histories of hay fever, asthma, urticaria and previous sensitivity to penicillin are more likely to react adversely to the penicillins. It is important that the possibility of penicillin anaphylaxis be kept in mind. Epinephrine and the usual adjuvants (antihistamines, corticosteroids) should be available for emergency treatment. Because of the resistance of STAPHCILLIN to destruction by penicillinase, parenteral *B. cereus* penicillinase may not be effective for the treatment of allergic reactions. Information with regard to cross-allergenicity between penicillin G, penicillin V, phenethicillin (Syncillin) and STAPHCILLIN is not available at present. If superinfection due to Gram-negative organisms or fungi occurs during STAPHCILLIN therapy, appropriate measures should be taken.

SUPPLY

List 79502 — 1.0 Gm. dry filled vial.

BRISTOL LABORATORIES · SYRACUSE, NEW YORK
Division of Bristol-Myers Company

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UNIQUE SYNTHETIC "STAPH-CIDAL" PENICILLIN

OFFICIAL PACKAGE CIRCULAR
November, 1960

STAPHCILLIN™

(sodium dimethoxyphenyl penicillin)

For Injection

DESCRIPTION

STAPHCILLIN is a unique new synthetic parenteral penicillin produced by Bristol Laboratories for the specific treatment of staphylococcal infections due to resistant organisms. Its uniqueness resides in its property of resisting inactivation by staphylococcal penicillinase. It is active against strains of staphylococci which are resistant to other penicillins.

Each dry filled vial contains: 1 Gm. STAPHCILLIN (sodium dimethoxyphenyl penicillin), equivalent to 900 mg. dimethoxyphenyl penicillin activity.

INDICATIONS

STAPHCILLIN is recommended as specific therapy only in infections due to strains of staphylococci resistant to other penicillins, e.g.:

Skin and soft tissue infections: cellulitis, wound infections, carbuncles, pyoderma, furunculosis, lymphangitis and lymphadenitis.

Respiratory infections: staphylococcal lobar or bronchopneumonia, and lung abscesses combined with indicated surgical treatment.

Other infections: staphylococcal septicemia, bacteremia, acute or subacute endocarditis, acute osteomyelitis and enterocolitis.

Infections due to penicillin-sensitive staphylococci, streptococci, pneumococci and gonococci should be treated with Syncillin® or parenteral penicillin G rather than STAPHCILLIN. Treponemal infections should be treated with parenteral penicillin G.

DOSAGE AND ADMINISTRATION

STAPHCILLIN is well tolerated when given by deep intragluteal or intravenous injection.

As is the case with other antibiotics, the duration of therapy should be determined by the clinical and bacteriological response of the patiert. Therapy should be continued for at least 48 hours after the patient has become afebrile, asymptomatic and cultures are negative. The usual duration has been 5-7 days.

Intramuscular route: The usual adult dose is 1 Gm. every 4 or 6 hours. Infants' and children's dosage is 25 mg. per Kg. (approximately 12 mg. per pound) every 6 hours.

Intravenous route: 1 Gm. every 6 hours using 50 ml. of sterile saline solution at the rate of 10 ml. per minute.

**Warning:* Solutions of STAPHCILLIN and kanamycin should not be mixed, as they rapidly inactivate each other. Data on the results of mixing STAPHCILLIN with other antibiotics are being accumulated.

DIRECTIONS FOR RECONSTITUTION

Add 1.5 ml. sterile distilled water or normal saline to a 1 Gm. vial and shake vigorously. Withdraw the clear, reconstituted solution (2.0 ml.) into a syringe and inject. The reconstituted solution contains 500 mg. of STAPHCILLIN per ml. Reconstituted solutions are stable for 24 hours under refrigeration.

For intravenous use, dilute the reconstituted dose in 50 ml. of sterile saline and inject at the rate of 10 ml. per minute.

*This statement supersedes that in the Official Package Circulars dated September and/or October, 1960.

(continued)

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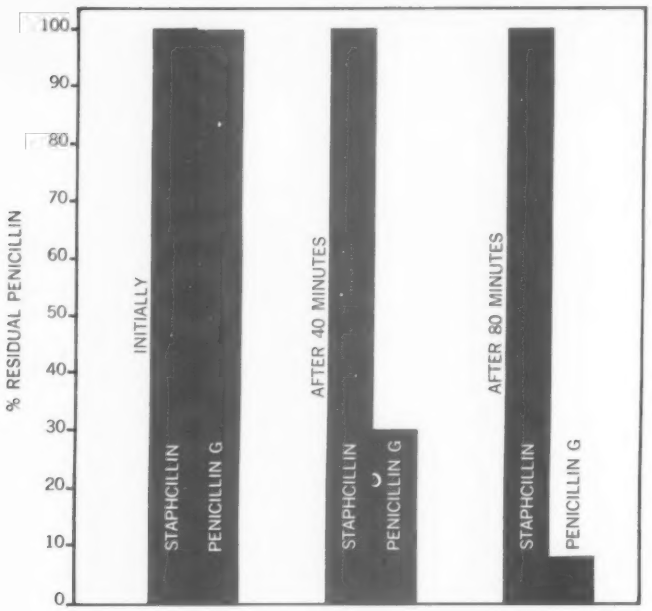
UNIQUE SYNTHETIC "STAPH-CIDAL" PENICILLIN



In the presence of staphylococcal penicillinase, STAPHCILLIN remained active and retained its antibacterial action. By contrast, penicillin G was rapidly destroyed in the same period of time. *(After Gourevitch et al., to be published)*

Specifically for "resistant" staph...

Staphcillin™

sodium dimethoxyphenyl penicillin
FOR INJECTION

The failure of staphylococcal infections to respond to penicillin therapy is attributed to the penicillin-destroying enzyme, penicillinase, produced by the invading staphylococcus.

Unlike other penicillins:

1 STAPHCILLIN is effective because it retains its antibacterial activity despite the presence of staphylococcal penicillinase.

2 The clinical effectiveness of STAPHCILLIN has been confirmed by dramatic results in a wide variety of infections due to "resistant" staphylococci, many of which were serious and life-threatening.

Like other penicillins:

STAPHCILLIN has no significant systemic toxicity. It is well tolerated locally, and pain or irritation at the injection site is comparable to that following the injection of penicillin G. *In occasional cases, typical penicillin reactions may be experienced.*

PROFESSIONAL INFORMATION SERVICE – The attached Official Package Circular provides complete information on the indications, dosage, and precautions for the use of STAPHCILLIN. If you desire additional information concerning clinical experiences with STAPHCILLIN, the Medical Department of Bristol Laboratories is at your service. You may direct your inquiries via collect telephone call to New York, PLaza 7-7061, or by mail to Medical Department, Bristol Laboratories, 630 Fifth Ave., N. Y. 20, N. Y.

BRISTOL LABORATORIES • SYRACUSE, NEW YORK

Division of Bristol-Myers Company

Now!—for Pharmacists—

Fast, Critical Washing of Flasks with the AMSCO Portable Automatic Flask Washer

Developed especially for the Sterile Fluids Technique, this completely new device washes flasks ranging in size from 75 ml. to 2,000 ml. . . . quickly, automatically and with uniformly high standards of cleanliness.

Operation is both simple and effective. Fully portable for space-saving and convenience, the washer is wheeled to the sink for operation and plugged into a 110V. outlet. Snap connections are made to hot and distilled water supplies and the drain hook is placed over the edge of the sink.

Once started, the cycle is automatic and continuous at the rate of six CLEAN flasks per minute. Each flask receives an initial rinse with hot tap water . . . followed by two detergent washes, a second rinse of hot tap water and a final rinse of distilled water. The process is easily within the accomplishment range of the most unskilled worker.

Write now for Bulletin MC-517

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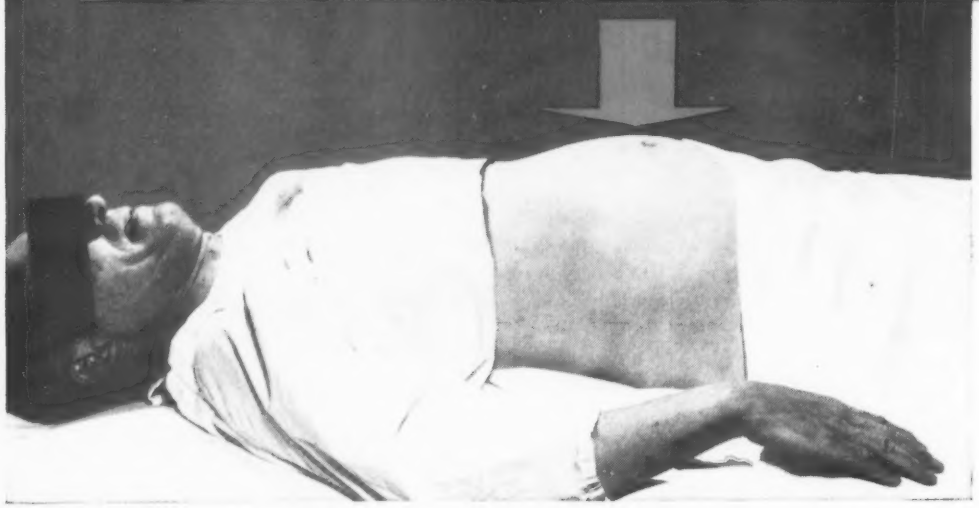

to prevent...to relieve... post-op distention and ileus

Surgical stress appears to increase the body's pantothenic acid requirements. ILOPAN (d-pantothenyl alcohol, W-T) provides additional pantothenic acid to aid restoration of normal peristalsis. Clinical studies and hundreds of case histories[1,2] attest the effectiveness of ILOPAN against postoperative retention of flatus and feces — even paralytic ileus — and in reducing the need for intestinal intubation, or the period of intubation.

ILOPAN may be used with a high degree of safety — is not contraindicated even under conditions of mechanical bowel obstructions, produces no hyper-peristalsis or cramping, no side effects — and can be routinely administered by the nurse.

2 cc. AMPULS
(500 mg.)
10 cc. VIALS
(2500 mg.)

1. Kareha, L. G., de Quevedo, N. G., Tighe, P., Kehrli, H. J., "Evaluation of Ilopan in Postoperative Abdominal Distention," Western J. Surg. Obs. & Gyn., 66:220, 1958.
2. Stone, M. L., Schlussel, S., Silberman, E., Mersheimer, W. L., "The Prophylaxis and Treatment of Postpartum and Postoperative Ileus with Pantothenyl Alcohol," Amer. J. Surgery, 97:191, 1959.

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clearer operative field . . .
less postoperative nursing . . .

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SALICYLATE

(Brand of carbazochrome salicylate)

The patient, surgical team and nursing staff all benefit when Adrenosem is part of the preoperative routine because it helps maintain capillary integrity.

Adrenosem decreases excessive capillary permeability and promotes retraction of severed capillary ends, thus diminishing excessive bleeding. This conserves the patient's own blood so less is needed from the blood bank. Since the operative field is clearer, surgical procedures are facilitated and operating time shortened. In the postoperative period, reduction in seepage and oozing means fewer calls on the nursing staff.

At recommended dosage levels there are no contraindications. The safety and effectiveness of Adrenosem have been proved in over seven years' use . . . fifteen million doses . . . thousands of hospitals.

*U.S. Pat. Nos. 2581980; 2606294

SUPPLIED: *For oral administration* —**Tablets:** 1 mg. (s.c. orange), bottles of 50, and 2.5 mg. (s.c. yellow), bottles of 50. **Syrup:** 2.5 mg. per 5 cc. (1 tsp.), bottles of 4 oz.

For I.M. injection—**Ampuls:** 5 mg., 1 cc., packages of 5 and 100; 10 mg., 2 cc., packages of 5.

Write for detailed literature and dosage information.

THE S. E. MASSENGILL COMPANY

Bristol, Tennessee • New York • Kansas City • San Francisco

TRAVENOL LABORATORIES, INC. Morton Grove, Illinois

YOU CAN SAVE SIGHT WITH UREVERT®

A 30% urea—lyophilized and highly purified—in combination with 10% invert sugar (TRAVERT®)

IN ACUTE ANGLE CLOSURE GLAUCOMA—
"dramatic response"

IN PREPARATION FOR INTRAOCULAR SURGERY—
"effective in cases in which carbonic anhydrase inhibitors had little or no effect"

IN RETINAL DETACHMENT SURGERY—
In 15 of 26 scleral buckling procedures "its use was definitely helpful."

IN ORBITAL SURGERY—
"orbital exploration has definitely been facilitated."

Reference: Javid, M., and Davis, M.: Scientific Exhibit No. 922, A.M.A. Annual Meeting (June) 1960.

Information You Would Request: UREVERT is a special modification of an old agent—urea. The specifications—30% urea, lyophilized and highly purified, in combination with 10% invert sugar (TRAVERT*)—were found to be optimal by researchers at the University of Wisconsin Medical School. More than four years of basic and clinical study have firmly established the value of UREVERT as the preferred agent for brain decompression, and now to reduce intraocular pressure.

The high urea concentration (30%) was made possible by extreme purification. The 10% invert sugar was found to be the only sugar solution, among many tested, that kept subjects consistently free of hemoglobinuria. The present UREVERT kit provides the purest materials and the optimal concentrations in the safest possible, most convenient form, in order to save time and eliminate contamination.

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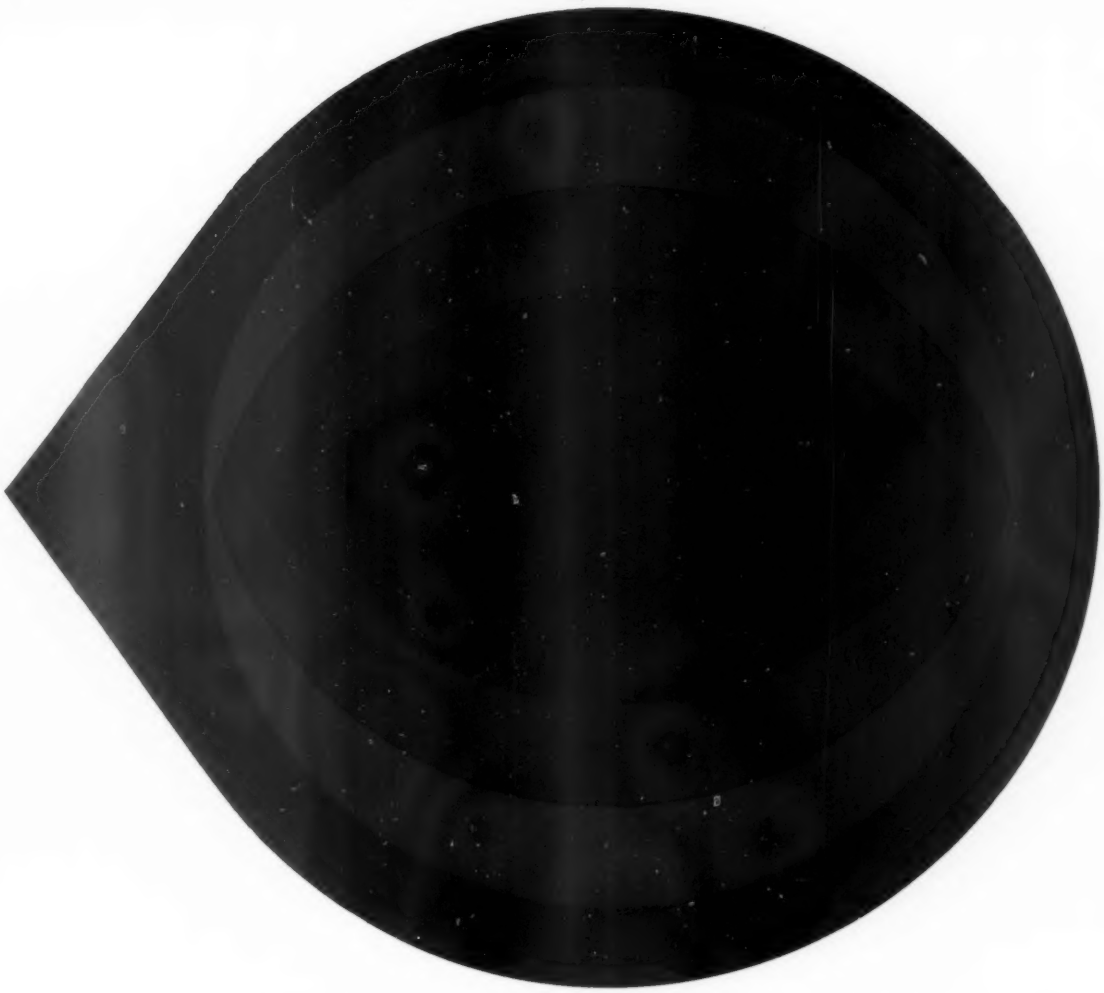

THE DRUG THAT REDUCES INTRAOCULAR PRESSURE EVEN IF MIOTICS AND CARBONIC ANHYDRASE INHIBITORS HAVE FAILED

Indications: UREVERT has proven to be extremely effective in reducing intracranial pressure preoperatively and postoperatively, irrespective of cause. Recent evidence shows that UREVERT will reduce intraocular pressure even when miotics and carbonic anhydrase inhibitors fail. It has been used with success in acute angle closure glaucoma, preparation for intraocular surgery, retinal detachment surgery, orbital surgery.

Dosage: Intravenously, one gram urea per kilogram body weight at rate of approximately 60 drops per minute.

Repeated Administration: 1. Careful recording of fluid intake and urinary output. 2. Maintain a positive water balance. 3. Maintain electrolyte balance and observe B.U.N. *Note:* In all cases under general anesthesia an indwelling catheter is necessary.

Contraindications: 1. Severe renal damage. 2. Active intracranial bleeding. 3. Marked dehydration.

Caution: 1. Keep needle securely within lumen of vein to avoid extravasation. If pain at site of injection, relieve by injection of 0.5 cc. of 1% procaine through same needle. 2. Lower extremity infusion in older patients.

Side Effects: Headaches may occur in patients with normal intracranial pressure from marked lowering of intracranial pressure. Keep patient flat in bed for duration of UREVERT administration and subsequent 2-3 hours.

REFERENCES: 1. Fremont-Smith, F., and Forbes, H. S.: Arch. Neurol.& Psychiat. *18*:550 (Oct.) 1927. 2. Javid, M., and Settlage, P.: J.A.M.A. *160*:943 (March 17) 1956. 3. Javid, M.; Settlage, P., and Monfore, T.: Surgical Forum 7:528, 1957. 4. Javid, M., and Settlage, P.: Tr. Am. Neurol. A. 1957, pp. 151-153. 5. Javid, M., and Anderson, J.: Surgical Forum 9: 1959. 6. Javid, M.: Surg. Clin. North Am. *38*:907 (Aug.) 1958. 7. Javid, M., and Anderson, J.: J. Lab. & Clin. Med. *53*:484 (March) 1959. 8. Stubbs, J., and Pennybacker, J.: *Lancet 1*:1094, 1960. 9. Tench, J. H.; Javid, M., and Gilboe, D.: Anesthesiology *21*:117 (Jan.-Feb.) 1960. 10. Javid, M., and Davis, M.: Scientific Exhibit No. 922, A.M.A. Annual Meeting (June) 1960.

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FOR ORAL, INTRAVENOUS OR INTRAMUSCULAR USE

Over 90 published papers since 1953

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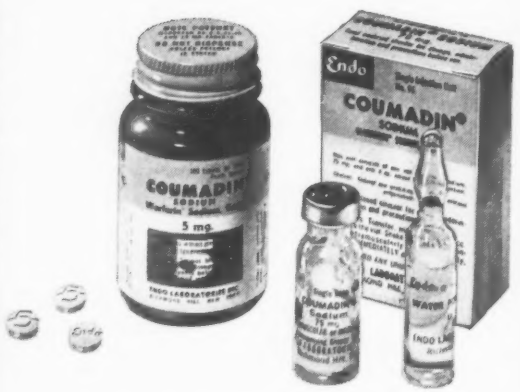
Over ~~114,000,000~~ doses administered to date



now more widely prescribed than all other oral anticoagulants combined

the original and only warfarin responsible for establishing this drug as closely approaching the *ideal* anticoagulant.[1,2]

1. Baer, S., et al.: J.A.M.A. 167:704, June 7, 1958.
2. Moser, K. M.: Disease-a-Month, Chicago, Yr. Bk. Pub., Mar., 1960, p. 13.

*Manufactured under license from the Wisconsin Alumni Research Foundation

Full range of oral and parenteral dosage forms—COUMADIN* (warfarin sodium) is available as: ***Scored tablets***—2 mg., lavender; 5 mg., peach; 7½ mg., yellow; 10 mg., white; 25 mg., red. ***Single Injection Units***—one vial, 50 mg., and one 2 cc. ampul Water for Injection; one vial, 75 mg., and one 3 cc. Water for Injection.

Average Dose: Initial, 40-60 mg. For elderly and/or debilitated patients, 20-30 mg. ***Maintenance***, 5-10 mg. daily, or as indicated by prothrombin time determinations.

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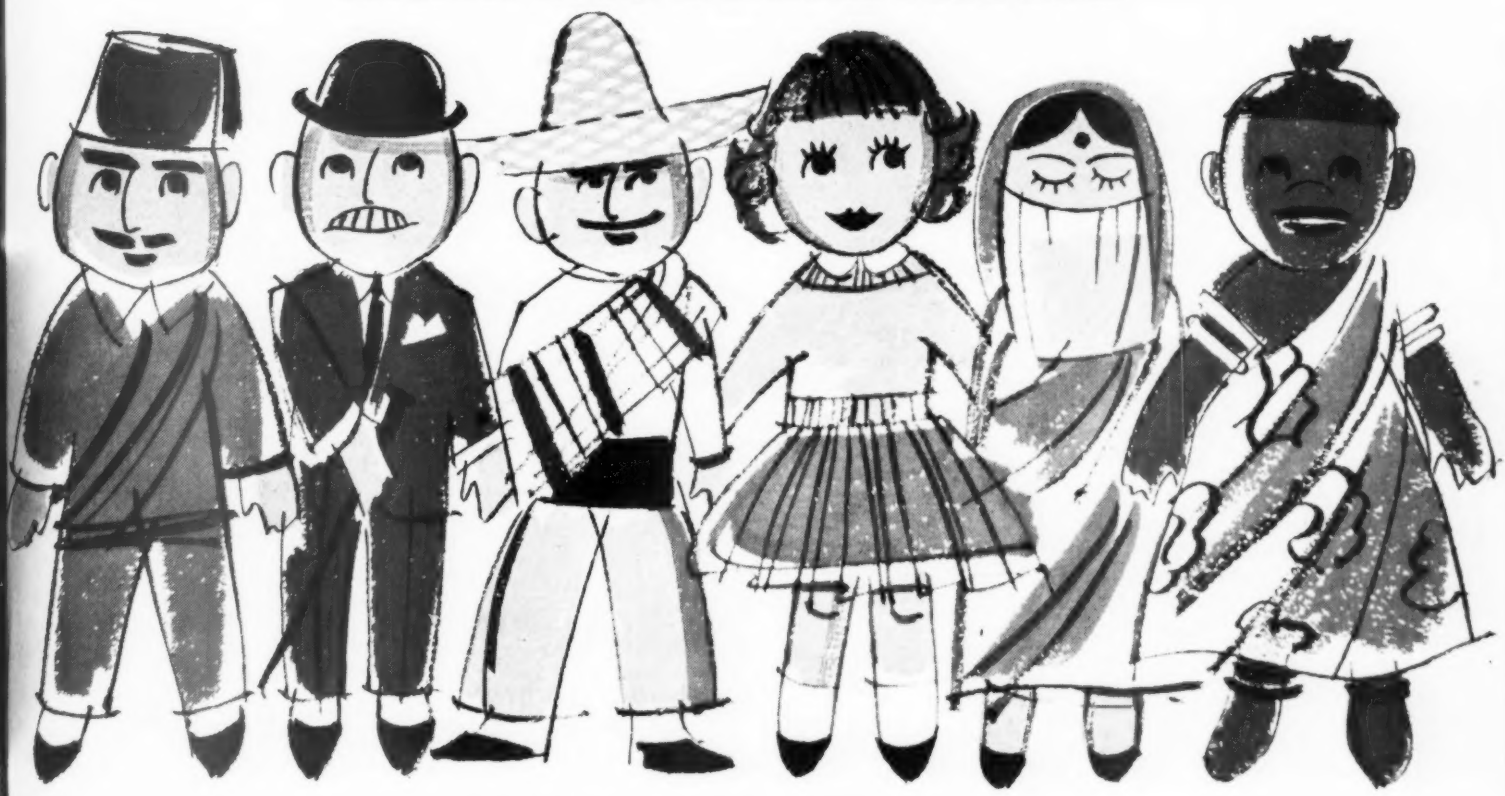

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Furoxone®

brand of furazolidone

for bacterial diarrheas*

● swiftly relieves symptoms ● succeeds where others fail against increasingly prevalent refractory strains of Staphylococcus, Escherichia, Salmonella and Shigella ● bactericidal rather than bacteriostatic ● side effects negligible ● does not encourage monilial or staphylococcal overgrowth ● has not induced significant bacterial resistance

Furoxone Liquid: a pleasant orange-mint flavored suspension containing Furoxone 50 mg. per 15 cc., with kaolin and pectin, bottles of 240 cc.
Furoxone Tablets: 100 mg., scored, bottles of 20 and 100.
Dosage: Adults, 100 mg. q.i.d.; children, 5 mg./Kg./day divided in four doses.

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Southeastern Society

Results of the election of officers for the Southeastern Society of Hospital Pharmacists for the 1961-1962 term have been announced. The president-elect is Howard Clem of Langdale, Alabama. The vice-president-elect is Owen L. Crutcher, of Johnson City, Tennessee. Results of the mail ballot election were announced by Carl Dell of Miami, Florida, Chairman of the Southeastern Society's Board of Canvassers.

Mr. Clem is the veteran chief pharmacist of the George H. Lanier Hospital, Langdale, Alabama, where he has served Alabama hospital pharmacy. As an outstanding civic leader in 1959, he was named Young Man of the Year in the Chattahoochee Valley. He is a graduate of Auburn University, is married and has one son, Howard, Jr.

Mr. Crutcher established the pharmacy service of the Memorial Hospital, Johnson City, Tennessee, where he has been chief pharmacist for seven years. He is a leader in Tennessee hospital pharmacy and is a graduate of Howard College, (Birmingham).

The newly elected officers will take office at the annual meeting of the Southeastern Society in Memphis in April 1961.

Northern California Society

Mr. Al Mannino of Geigy Laboratories, was the principal speaker at the January 10 meeting of the Northern California Society of Hospital Pharmacists. This was also the annual installation of officers' banquet which was held at the Red Chimney Restaurant at Stonestown, San Francisco. In Mr. Mannino's talk, he showed slides depicting a theoretical concept of the automated pharmacy of the hospital of the future. The pictured story outlined a series of diagnostic electronic tape machines feeding information from the physicians and ancillary laboratory facilities to a master machine which analyzed the drug needs of each patient and in turn activated another machine which measured out the proper amount of drugs selected. The drugs were propelled through tubes to the patient's bedside where the actual administration of the drug was overseen by a nurse at a control panel with a closed circuit television picture showing all the beds in the ward. The futuristic pharmacist was portrayed as a combined pharmacologist-pharmacy director and electronic engineer in command of a battery of electronic control boards.

During the meeting, Mr. George Gruber served as master of ceremonies, introducing the following guests of the Society: Dean and Mrs. T. C. Daniels, of the College of Pharmacy, University of California; Dean and Mrs. C. Rowland, College of Pharmacy, University of Pacific; and Mr. and Mrs. Floyd Heffron, Secretary of the California State Board of Pharmacy. Mr. Gruber also introduced Mr. Jack S. Heard, president-elect of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS; and Mr. Donald Holloway, pharmacy intern at the U. S. Pub'ic Health Service Hospital in San Francisco. Past-presidents of the Northern California Society of Hospital Pharmacists were introduced by Miss Jessie Lavender, the immediate past-president.

At the installation of officers, the gavel was turned over to President Charles Jackson. Mr. Yut Gong will be serving as vice-president, Miss Ellen Berlin as treasurer and Mr. Donald Williams as secretary.

Southern California Society

Members of the Southern California Society of Hospital Pharmacists met at the U.C.L.A. Medical Center in Los Angeles on October 12. A welcome was presented by Mr. Kenneth Eastman, Administrator. The guest speaker was Dr. Dermitt Taylor who gave a presentation of a recent tour through South America, primarily Peru, in search for crude drugs. His talk was accompanied by colored slides.

Business transacted included nominations for officers for 1961, proposals for revisions in the Constitution, reports of standing committees, and a report on the national convention by Frank Gianetti. Miss Nellie Nigro presented a report on the student visitation day program.

Colorado Society

Members of the Colorado Society met on January 7 for the annual installation of officers. The meeting included a dinner sponsored by E. R. Squibb at the Cosmopolitan Hotel in Denver.

The December 20 meeting of the Colorado Society was held at the National Jewish Hospital in Denver. Announcements were made regarding the Hospital Pharmacy Residency Program in cooperation with the Veterans Administration Hospital in Denver, a proposed graduate course in pharmacology at the University of Colorado, and plans for the forthcoming Seminar to be held at Fitzsimons General Hospital.

Election ballots were counted with the following results: Irvin A. Friesen, president; Herbert S. Carlin, vice-president; Margie C. Gaasch, executive secretary; Marjorie N. Pickett, recording secretary; and Kathleen M. Springer, treasurer.

Massachusetts Society

Members of the Massachusetts Society of Hospital Pharmacists met at the Jimmy Fund Building Auditorium in Boston on November 30. President John Webb called the meeting to order at 7:30 P.M. Representatives of the State Board of Registration in Pharmacy were present to discuss reasons why hospital pharmacy should be under the jurisdiction of the Board of Registration in the state. A bill has been filed in Massachusetts to license hospital pharmacies.

During a discussion concerning ways to interest young people in hospital pharmacy, it was suggested that senior students who are employed in hospitals be invited to some of the Society's meetings during the year.

The Massachusetts Society held its December 14 meeting at the Potter Drug and Chemical Company, in Malden, Massachusetts. Members of the Society had an opportunity to tour the plant as well as meet members of the staff.

Michigan Society

Members of the Michigan Society of Hospital Pharmacists joined with the Michigan Branch of the American Pharmaceutical Association for a meeting on January 12 at McGregor Memorial Conference Center at Wayne State University, Detroit. The principal speaker, Mr. Joseph A. Oddis, Director of the Division of Hospital Pharmacy and Executive Secretary of the ASHP, Washington, D. C., discussed "The ASHP and Hospital Pharmacy." In his presentation, Mr. Oddis reviewed the activities of hospital pharmacists and related some of the problems which the group faces at this time. He also covered some controversial areas and items of particular interest to the community practitioners.

Society of Greater Kansas City

Members of the Society of Hospital Pharmacists of Greater Kansas City met at the Blue Cross-Blue Shield Building on Monday, December 5 at 2:30 P.M. President W. F. Wilhelm presided over the meeting attended by fourteen members.

Business transacted during the meeting included plans for participation in the Health Fair, nomination of an individual for the 1961 Harvey A. K. Whitney Lecture Award, and a discussion regarding the possibility of organizing a branch of the American Pharmaceutical Association in Kansas City.

The Society of Hospital Pharmacists of Greater Kansas City met at the Blue Cross-Blue Shield Building on Monday, November 7 at 2:30 p.m. The meeting was called to order by President W. F. Wilhelm, with twenty-nine persons present.

The president immediately introduced the guest speaker, Dr. Victor B. Buhler, pathologist. Dr. Buhler gave an informative lecture on "Blood Typing." He concluded by showing slides on effect in body tissues of incompatible Rh factors. The president thanked the speaker in behalf of those present for his presentation.

Business covered during the meeting included plans to offer assistance to the Missouri Pharmaceutical Association in connection with the Health Fair project, reading of communications from the national office, and a report concerning dismissal of a registered pharmacist at the local Air Force Base.

New Jersey Society

Members of the New Jersey Society of Hospital Pharmacists were entertained at Organon, Inc., in West Orange, New Jersey on January 19. Following a buffet supper, the meeting was called to order by Vice-President Henry Roche. Due to the inclement weather, a limited number of members were present and a business meeting was therefore not held.

Those present had an opportunity to meet members of the staff at Organon including Mr. James Greco, manager of hospital sales and services, Dr. H. A. Strade, medical director, Dr. K. Thompson, vice-president in charge of research and Mr. Alan Kusik, vice-president. Following discussions by members of the staff, those present toured the Organon plant.

Members of the New Jersey Society of Hospital Pharmacists met on November 17 at the Passaic General Hospital in Passaic. The group was welcomed for the dinner meeting by Mr. Joseph Mattson, administrator, and also Mr. Alex Chabora, chief pharmacist. Business conducted during the meeting included reports on the dinner dance held annually by the New Jersey Society and on the recent Hospital Pharmacy Seminar held in cooperation with Rutgers University School of Pharmacy and Pfizer Laboratories, nominations for the H.A.K. Whitney Award, and reports from officers.

Participants in the November 12 Hospital Pharmacy Seminar held by the New Jersey Society. Shown left to right are Mr. Ludwig Pesa, St. Mary's Hospital, Passaic; Dr. Morton J. Rodman, Rutgers University College of Pharmacy; Miss Laura Simms, Cornell University—New York Hospital School of Nursing; Mr. Robert A. Walsh, Peter Bent Brigham Hospital. Boston; and Dr. Frederick C. Fink, Chas. Pfizer & Company, Inc.

The program included a talk by Dr. Jaime Martinez who showed a film on the use of an artificial kidney, stressing the role of the pharmacist in the preparation of solutions. Dr. Martinez then demonstrated operation of the artificial kidney which is part of the equipment at Passaic General Hospital, and answered questions from the group. The film was shown through the courtesy of Baxter Laboratories.

Greater New York Society

At the January 17 meeting of the Greater New York Chapter, members of the group continued the workshop on the U.S.P. XVI which was started at a previous meeting. The meeting was held at the St. Francis Hospital in Jersey City, New Jersey with Sister Bernardine presiding. In addition to routine reports, the group considered the following additional business.

Action on the slate presented by the Nominating Committee was deferred as the chairman of the Committee on By-Laws was instructed to look into the matter of combining the two offices of recording secretary and corresponding secretary and of extending the office of secretary to a three-year term.

Sister Etheldreda read a communication received from the Committee on Historical Records of the ASHP recommending that the Affiliated Chapters to send material for the compilation of the history of the second decennium of the ASHP and also biographical data on outstanding deceased hospital pharmacists. Sister Bernardine volunteered to write an addendum to the ten-year history of the Greater New York Chapter which has just completed its fifteenth year.

It was announced that the symposium on hospital pharmacy planned by the New York State Council of Hospital Pharmacists will be held at the Sheraton Park Hotel, New York City, on Saturday, May 27, 1961. It will be sponsored by the Charles Pfizer Company in cooperation with the New York State Council.

Following announcements regarding future meetings, Sister Clarissa, chief pharmacist at St. Francis Hospital, led a tour of the pharmacy department.

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Northeastern New York Society

The Northeastern New York Society of Hospital Pharmacists met on Wednesday evening January 25 at the Albany Medical Center Hospital in Albany. The meeting was held in conjunction with the Hudson Valley League of Nursing, the New York State Council of Nurses—District 9, and the Albany Council of Catholic Nurses. President Joyce A. Nautel presided with Mr. Louis P. Jeffrey and his staff at the Albany Medical Center serving as hosts.

The group welcomed by Dr. Ferdinand Haase, Jr., medical director at the Center, who outlined the plans and aims of the Albany Medical Center.

Mr. John J. Bellizzi, director, Bureau of Narcotic Control, New York State Department of Health, was the principal speaker. He discussed the dual responsibility of both the nurse and the hospital pharmacist in the control of narcotics in a modern medical center. A question and answer period followed Mr. Bellizzi's talk and a film supplied by the New York State Department of Health, "Someone is Watching" was shown. Also, copies of the New York State Narcotic Law were distributed to those attending the meeting.

Following the program, Mr. Jeffrey, chairman of the Committee on Workshop and Program, discussed the February meeting to be held at the Sterling Research Institute in Rensselaer, N. Y. President Nautel closed the meeting with a brief discussion of the recent educational trip to Lederle Laboratories in Pearl River, N. Y. A reception followed in the Physicians' Dining Room in the hospital.

The photo shown below was taken when Miss Joyce A. Nautel was installed for a second term as president of the Northeastern New York Society. Shown with Miss Nautel are Dean Francis J. O'Brien of the Albany College of Pharmacy and Mr. Paul A. Freeman of E. R. Squibb and Sons

Akron Area Society

An open discussion on methods of controlling hypnotics and narcotics made up the program for the January 10 meeting of the Akron Area Society of Hospital Pharmacists. The meeting, held at Robinson Memorial Hospital in Ravenna, Ohio, was called to order at 7:50 P.M. by President Hildah Douglas.

Routine reports were received from the various committees, plans for future meetings were announced, and new hospital pharmacists in the area were introduced.

Oregon Society

Included in reports at the December 14 meeting of the Oregon Society of Hospital Pharmacists, was one on a meeting of the Legislative Committee of the Oregon State Pharmaceutical Association and other Oregon pharmacy groups. Russell Austin represented the Oregon Society of Hospital Pharmacists. The purpose of the meeting was to consider a bill which is to be presented to the 1961 legislature. Its purpose would be to better control illicit drug peddling by defining in detail such acts and providing practical means of enforcement of the law. The Society was urged to support this bill as individuals and also as a group by putting its endorsement on record.

Mr. Byron Smith announced plans of the Oregon State College School of Pharmacy and the General Extension Division of the Oregon State System of Higher Education for a Seminar to be held on January 19 at the Coliseum. Members of the Society were urged to participate.

Dr. Wayne Schultz of the Oregon State College, School of Pharmacy announced that the annual students' tour of hospitals in Portland is scheduled for February 24 with the itinerary to be the same as last year. Mr. Byron Smith was appointed chairman of the event.

Members of the Oregon Society were invited to attend a joint meeting of the Oregon State College and the A.Ph.A. Branch in January at which time Mr. Ronald Robertson, president of the A.Ph.A., would be the principal speaker.

Western Pennsylvania Society

New officers of the Western Pennsylvania Society elected to serve for the 1961 term include *President* Charles Cleveland, Citizens General Hospital, New Kensington, Pa.; *Vice-President* Sister M. Constantia, St. Joseph's Hospital, Pittsburgh 3, Pa.; *Secretary* Carole Finelli, West Penn Hospital, Pittsburgh, Pa.; and *Treasurer* William Sinclair, Allegheny Valley Hospital, Tarentum, Pa.

The new officers will be installed on January 28 at a banquet sponsored by E. R. Squibb and Company at the Stouffer's Restaurant in Oakland.

Houston Area Society

The Houston Area Society of Hospital Pharmacists held its first meeting of 1961 at St. Joseph's Hospital in Houston on Sunday afternoon, January 22, with 19 members and 3 guests present. Jack Farmer, vice-president, presided, and Minnie Z. Jones, secretary-treasurer, read minutes of the last two meetings and gave the treasurer's report.

Installed as officers for 1961 were: Jack Farmer, V.A. Hospital, Houston, *president;* Ben Parma, University of Texas Medical Branch, Galveston, *vice-president;* Adela Schneider, Southern Pacific Hospital, *secretary-treasurer.* Franz Geisz, chief of pharmacy service at the University of Texas Medical Branch, was named delegate to the Annual Meeting of the ASHP in Chicago.

After the business meeting, Mr. Farmer introduced Mr. Bill Robertson, executive secretary of the Harris County Medical Society, who for three years before coming to his present position in Houston, was public relations director for the Texas Medical Association.

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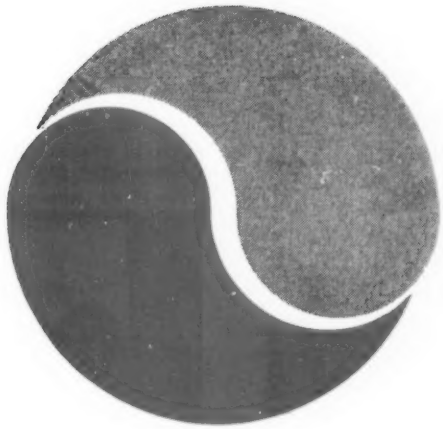

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CONTINUED FROM PAGE 26

A group meeting at the Western Pennsylvania Society's Seminar in October. Shown left to right are James Sandala, president of the Society; ASHP Secretary Joseph Oddis, Washington, D. C.; Dean John Adams of Duquesne University School of Pharmacy, Pittsburgh; Edgar M. Duncan, U. S. Public Health Service Hospital, Chicago; and Gerard J. Wolf, Mercy Hospital, Pittsburgh

Taking as his key note the expression, "There is no such thing as a free lunch," Mr. Robertson presented the history of the trend toward medical care by government aid and called attention to current events in regard to this matter. He urged the hospital pharmacists to think of the welfare of our related professions, pointing out that in Texas our professions have become very close and have ample opportunity to learn to understand each other's problems because the Texas Medical Association, the Texas Hospital Association, and the Texas Pharmaceutical Association maintain the same legal counsel in Austin, the capital.

After the meeting Sister M. Dolorita, Dorothea Siler, Ira Jones and Janie Reed, staff pharmacists at St. Joseph's Hospitals, invited all to an attractive table for a repast of sandwiches, cookies, and coffee.

North Dakota Society

Members of the North Dakota Society of Hospital Pharmacists met at the New Armory Building at Williston, North Dakota on October 19 and 20 for a joint meeting with the North Dakota Hospital Association. The Society's official semi-annual meeting was also held during the convention.

Among the presentations at the North Dakota Hospital Association meeting was one by Mr. John A. Finnie, chief pharmacist and assistant administrator at St. Luke's Hospital in Fargo. He spoke on "Hospital Pharmacy Regulations in Other States." Other speakers and titles included the following:

"Challenges of the Sixties," by Clarence E. Wonnacott, Latter-Day Saints Hospital, Salt Lake City, Utah.

"Automation Cuts Hospital Costs and Makes People Happier," by B. C. Benson, hospital market manager, Minneapolis Honeywell, Minneapolis, Minnesota.

A panel discussion on "Hospitals in the Public Eye," was presented from different viewpoints including 1. as viewed statewide, by Dean Thomas E. Clifford, University of North Dakota, Grand Forks; 2. as seen nationally, by Clarence E. Wonnacott; and 3. as viewed by the government, by Hjalmer Nygaard, Speaker of the House of Representatives, Enderlin, North Dakota.

"Legislation Trends," by William Daner, attorney, Manden, North Dakota.

"Proposed Regulation—19, Hospital Pharmacy Practices," by James Moore, State Board of Pharmacy, Bismarck.

"How Does a Small Hospital Comply with the Standards," was a panel discussion.

A report on the Convention of the American Pharmaceutical Association and the Annual Meeting of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS held in Washington, D. C. in August, was presented by Sister M. Emmanuel, O.S.B., director of pharmacy service, St. Alexius Hospital, Bismarck.

"Pharmacy Service to Small Hospitals in North Dakota," by Phil Haakenson, hospital pharmacy intern, St. Alexius Hospital, Bismarck.

At the business session of the North Dakota Society of Hospital Pharmacists, items covered included committee reports, plans for Career Days, public relations, announcements of future meetings, participation in Project HOPE, election of officers, and proposed changes in the Constitution and By-Laws.

Washington State Hospital Pharmacists

Members of the Washington State Hospital Pharmacists joined with the British Columbia Branch of the Canadian Society of Hospital Pharmacists for a Seminar on November 19. Meetings were held at the Royal Jubilee Hospital in B.C. where Mr. J. E. Smith is chief pharmacist. Following registration at St. Joseph's Hospital, also in Victoria, the day's program included a tour of the city, a tour of the pharmacy at the Royal Jubilee Hospital where special techniques in the preparation of sterile solutions and bulk compounding were demonstrated, panel discussions and guest speakers on subjects of high interest, and a final dinner at which time Mr. Glen Moir of the Faculty of Pharmacy at the University of B.C. spoke on the meetings of the International Pharmaceutical Federation held in Copenhagen in September.

Speakers included Mr. C. W. Burr, a hospital pharmacist who is now Civile Defense Health Supplies Officer for B.C., who discussed "Disaster Planning for Hospital Pharmacies"; and Mr. Glen Moir who spoke on "Minimum Requirements for Hospital Pharmacy Design." Participants also had an opportunity to hear a series of panel discussions with Mr. D. Clarke, chief pharmacist at St. Joseph's Hospital, as moderator. These discussions included Washington State Hospital Pharmacy Standards, B.C. regulations affecting Hospital Pharmacies, and After-Hour Pharmacy Services. In a later workship session moderated by Mr. J. E. Smith, subjects covered included generic names and brand names, group purchasing, prescription drugs—who pays and for what, disaster supplies, and poison control.

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references: 1. J.A.M.A., 169:41, 1959. 2. J.A.M.A., 173:240, 1960. 3. Federal Register, 25:136, July 14, 1960, p. 6633. 4. Frohlich, E. D., New Eng. J.M., 259:1221, 1958.

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TENTH OF A SERIES WITH SIGNIFICANT SUGGESTIONS FOR CONTROLLING CROSS INFECTIONS

HERE it is the season again to be on the alert against spread of flu and flu-like illnesses which, all too frequently, lead to staphylococcal pneumonia and death in high-risk patients. Although the influenza epidemic wave of the first three months of 1960 was not as severe as the Asian-flu winter of 1957-1958, the USPHS still considers that it caused 26,000 excess deaths during the period. Of these, 80% were in patients over 65 years old and 90% were attributable either to pneumonia-influenza or complications of renocardiovascular diseases. Unlike many viruses, the influenza virus can and does persist for days in virulent form in the environment unless destroyed by intensive disinfection measures.

Last month, when we first told you about our new Amphyl® Spray Disinfectant and Deodorant, we were so intent on its convenience and effectiveness as a spot disinfectant and air deodorant that we forgot to mention one of its very good features. This is that it does not leave an oily or sticky residue. To demonstrate this, one of our technical representatives applies Amphyl Spray to his white shirt cuff! For surfaces, you can demonstrate it on a glass door or mirror—but why not spray it right on to a door handle or bed side table where it can go to work as the disinfectant it is? Would you like our descriptive folder and bacteriologic reports on Amphyl Spray? If so, please write us.

"Staphylococcal enteritis or staphylococcal diarrhea among our hospitalized patients is a source of concern to us, since we do not know its exact relation to potentially fatal pseudomembranous enterocolitis, to the possible role of intestinal staphylococci in serving as a reservoir for staphylococcic infection of other patients in our hospitals, or to the transfer of these intestinal organisms to other parts of the body where their presence may present serious problems, such as wound infections, pneumonia and septicemia."

Drs. Dearing and Needham of the Mayo Clinic and Mayo Foundation made the above comments after a two-year study of 243 consecutive, hospitalized patients whose stool cultures revealed the presence of Staph. aureus. (J.A.M.A., Nov. 19, 1960) Although none of the seven stated purposes of this study was evaluation of the extreme dangers of cross infection, awareness of this potential is evident throughout the report.

In the care of such patients, aseptic housekeeping measures are essential to help avoid autoinfection of the patient, spread of organisms to other patients, and infections of personnel. Thorough disinfection of floors and equipment, as well as linens and blankets, is dependably accomplished with any one of the L&F refined phenolic disinfectants—Amphyl®, O-syl®, and Lysol® disinfectants or Tergisyl®, our detergent-disinfectant. As you know, all are widely microbicidal, including staphylocidal, pseudomonacidal, tuberculocidal and fungicidal. Specific recommendations for using each product are available for individual or group instruction. If you need multiple copies for teaching purposes, just let us know. We'll be glad to send them.

If you're wondering whether it's still important for a disinfectant to be a tuberculocide, consider this statistic from the Virginia Public Health Department. In the years 1957 to 1959, 42% of the tuberculous individuals who died were first identified as such on the death certificate.

Many long-range reports now being published confirm that, in most hospitals, staph infection exists at an endemic level. Goal of contamination control measures is to lower that level and to prevent emergence of epidemics or, should they occur, to curtail them quickly. Isolating patients admitted with staph infections, as well as those developing staph infections after admission, is now widely recommended. Frequently, the success of such units in preventing spread of infectious organisms throughout the hospital depends upon specific and dependable disinfection procedures within the isolation unit. *Use of Amphyl® on floors, walls, furniture and fixtures and in laundering blankets, linens, and curtains will destroy these offending organisms. Our new literature covers specific instructions for Amphyl disinfection of isolated units. Bacteriologic data is, of course, included. May we send it to you?*

℞ for eliminating staphylococci from 50 blankets: add 1 gallon of Amphyl® to 100 gallons of water, rotate for 3 minutes, soak for 10 minutes, add soap or detergent and follow usual washing procedure. If residual antibacterial effect is desired, add 1% Amphyl to last rinse.

If there's any doubt in your mind about the basic role that bactericidal floor cleaning can play in infection control, please write us for a reprint of the article "The Floor As A Reservoir Of Hospital Infections", by Carl W. Walter, M.D., and Ruth B. Kundsin, Ph.D., as published in Surgery, Gynecology & Obstetrics, October, 1960. Graphic comparisons are made between bacterial counts when floor disinfection is done at 30-day intervals and 24-hour intervals. The difference is significant.

Have you a baffling contamination control problem in your hospital on which we might help? Although we realize that disinfection is only one part of the complete control program, as you know, it is an important one. Our research laboratories and technical advisers are ready to help and I, personally, would like very much to hear from you.

Charles F. Manz
General Sales Manager
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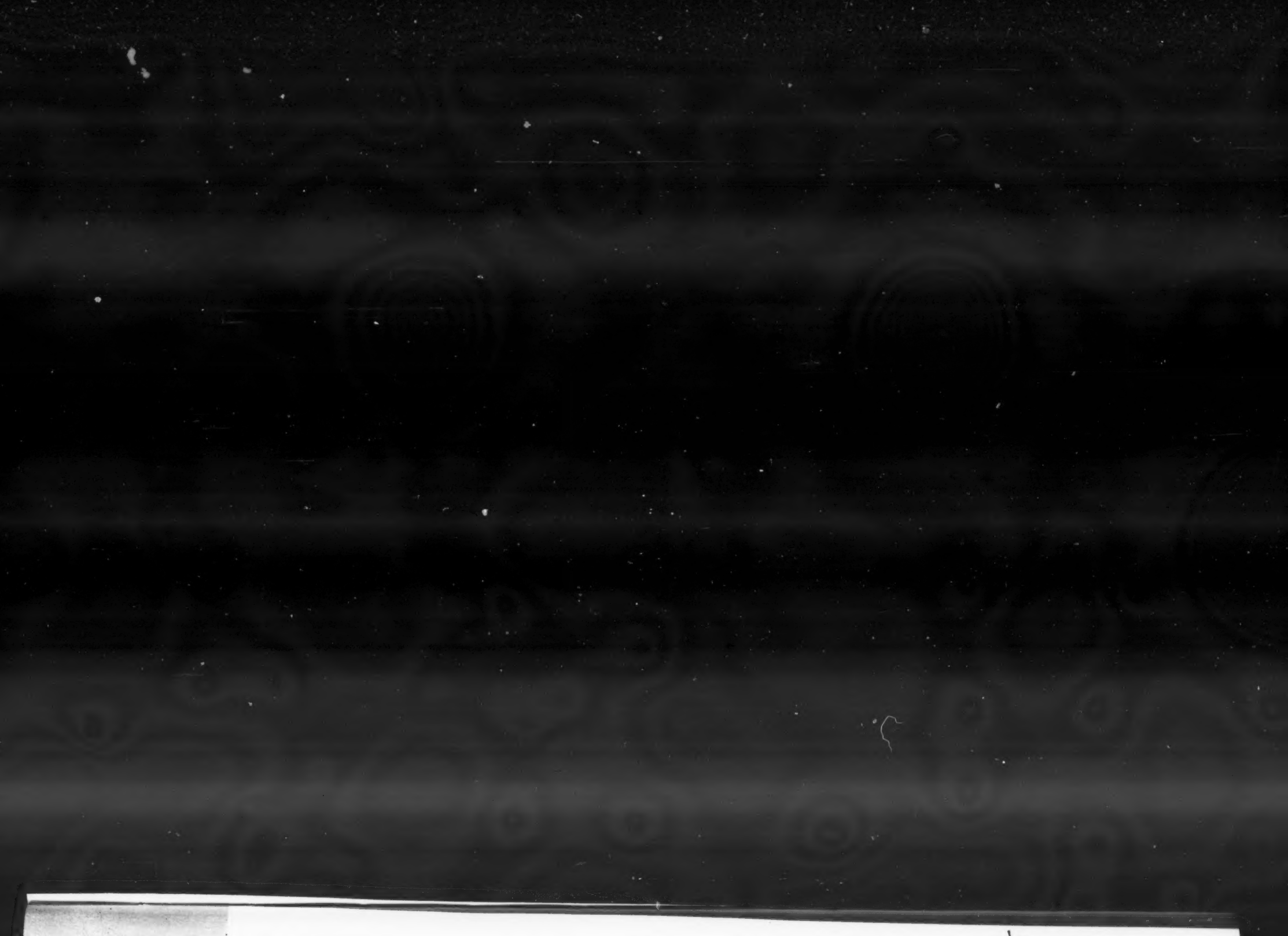

Dear Sirs:

Confusion in Strength of Heparin Sodium

DEAR SIRS: The help of hospital pharmacists is being asked in an effort to clear up confusion on declaring the potency of heparin sodium. Since October 1, 1960, when U.S.P. XVI took effect, parenteral forms of heparin have been required to show the potency in U.S.P. Units. This "outlawed" (as far as interstate shipments are concerned) products labeled in metric units, i.e. milligrams, which have long been misleading anyway for the following reasons.

Heparin sodium is not a synthetic product, being derived from natural sources, and it is not available in pure form. It is not a single entity but rather represents a family of related compounds, which vary in anticoagulant activity. Research to make heparin more and more active has succeeded but the clinical dosage forms have always been of uniform potency—because heparin producers have worked in terms of units. When heparin was first marketed, it had a potency of barely 100 units per mg.; indeed, European producers still insist that a purity level of 80 units per mg. is ample. Now, the heparin that goes into U.S.P. Heparin Sodium Injection must be at least 120 units per mg. and some of it runs as high as 150 units per mg. It may not go much higher but it will vary as long as present production methods are used. Hence the U.S.P. Revision Committee had no choice but to require that labeling be only in terms of U.S.P. units.

However, clinicians and pharmacists are plagued by the mistake made years ago to label the clinical forms of heparin in terms of milligrams. Generally, every encouragement should be given to giving drug concentrations in metric units rather than activity units for pure compounds. Thus the labels of vitamin products are showing more and more expressions of quantities in milligrams instead of units. But heparin is a case where metric measure is not applicable as the following example illustrates.

The usual dose of simple, short-acting heparin sodium injection has always been about 0.5 ml. Ten years ago, this dose might have contained 5 mg. of U.S.P. Heparin Sodium but today, to have the same strength, the injection may not contain more than about 4 mg. and probably contains not much more than 3 mg. because U.S.P. Heparin Sodium is of greater purity. All along, the 0.5 ml. dose has had the same 500 U.S.P. units but it seldom contained 5 mg. of heparin sodium. Legally, a manufacturer cannot claim "5 mg." when only between 3 and 4 mg. is present.

Hospital pharmacists as a group dispense most of the heparin used. The way out of the existing confusion is for them to order Heparin Sodium Injection as "1000 (U.S.P.) Units per ml." if in the past they have ordered it as "10 mg. per ml." The other strengths may be ordered similarly.

LLOYD C. MILLER, PH.D., *Director of Revision*
Pharmacopeia of the United States of America
46 Park Avenue
New York 16, N. Y.

From Israel

DEAR SIRS: . . . We would like to be informed regarding the universities in the United States which provide postgraduate studies in hospital pharmacy, which courses are offered, and whether there exists internships, assistantships, fellowships, etc.

It may interest you to know that we are subscribers to the AMERICAN JOURNAL OF HOSPITAL PHARMACY and greatly appreciate its regular receipt and most informative contents.

A. SEVER, *Director of Pharmacy*
ASAF Harofe Hospital
Zerifin, Israel

Request for "Timely Articles"

DEAR SIRS: . . . Would you please send me copies of the articles entitled "Pros & Cons of Generic Nomenclature," and "The Therapeutic Implications of Brand Interchange," which appeared in the December (1960) issue of your Journal . . . Thank you for your informative and timely articles.

D. L. THORN
1632 Second Avenue, N.E.
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ASHP INVITES

Distinguished Hospital Pharmacist and Dean to Address Annual Meeting

► DR. SVEND AAGE SCHOU, Director of Pharmacy Service at the University Hospital, University of Copenhagen and Dean of the Royal Danish School of Pharmacy has accepted the SOCIETY's invitation to address its Annual Meeting in Chicago during the week of April 23. Tentative plans call for Dr. Schou to present two papers and to participate in a panel discussion. In a paper entitled "Our Professional Ethic," Dr. Schou will discuss some of the ideals of pharmacy as manifested by its practitioners. His second presentation will deal with the "Operation of an Assay and Control Division of a Hospital Pharmacy."

Dr. Schou has an outstanding record as a practicing hospital pharmacist. educator, and research worker. A pharmacist since 1918, he early served as an assistant at the State Serum Institute of Copenhagen and at the Royal Danish School of Pharmacy. In 1923 he obtained the gold medal of the University of Copenhagen. Dr. Schou studied in Zurich under the direction of Professor Victor Henri and, later, obtained the degree of Doctor of Sciences at the Sorbonne in Paris. In 1929 he was awarded the Doctor of Philosophy degree by the University of Copenhagen. At the same time he was appointed as Lecturer and Chief Pharmacist at the University Hospital. In 1932 he was appointed as Lecturer and, in 1936, Professor of Pharmacy at the Royal Danish School of Pharmacy. He is Editor of the *Dansk Tidskrift for Farmaci* and a member of the Danish Pharmacopoeia Commission.

Professor Schou has published more than one hundred contributions to the literature. He is the author of many textbooks and monographs including his textbook of galenical pharmacy with seven successive editions. His books on hormones and hormone preparations, prepared in collaboration with A. Lundsgaard, have been published in four editions and his textbook of technical pharmacy with two editions was prepared in collaboration with A. Jermstad.

After preliminary work with Professor Baggesgaard Rasmussen, Dr. Schou did research work in Zurich and in Paris on spectrography on the absorption spectrum of many organic compounds, mostly of formaldehyde and other aldehydes in relation to their structure and activation. After this basic physico-chemical training abroad, Dr. Schou undertook pharmaceutical research as soon as he returned to Copenhagen and published successive papers on the determination of morphine, on preparation and analysis of iodinated sesame oil, on studies on injection solutions with ten successive contributions from 1931 to 1945. In these latter presentations, he discussed the preparation as well as the stability of the galenical preparations of the *Danish Pharmacopoeia,* optical properties of ergometrine, the colorimetric determination of ergotoxine and ergometrine and the stability of the fluidextract of ergot, etc. The latter study was done in collaboration with Dr. M. Toennesen. Dr. Schou has made numerous other contributions to the literature, including articles on pharmaceutical education. At the F.I.P. Congress of Pharmaceutical Sciences in Zurich in 1959, Dr. Schou presented two papers on the stabilization and stability of drugs.

Among Dr. Schou's honors and activities are the following: Chairman of the Chemical Society of Copenhagen, 1937-1940; Extraordinary member of the Medical Society of Copenhagen; Chairman of the Association of Hospital Pharmacists of Denmark; Chairman of the Danish Pharmaceutical Society, 1940-1943; Knight of The Order of Dannebrog, 1941; Member of the Academy of Technical Sciences, Copenhagen; Corresponding member of The Norwegian Pharmaceutical Society; Recipient of the Gold medal of the Danish Pharmaceutical Society, 1947; Member of The Commission on the System of Pharmacies, 1947; Member of The Scandinavian Pharmacopoeia Council; Knight of The Swedish Order of Nordstjernen, 1949; Knight of 1st class of The Order of Dannebrog, 1951; Honorary member of The Finnish Pharmaceutical Society, 1951; Member of the Board of The State Fund of Sciences; Honorary Member of the Swedish Pharmaceutical Society; Doctor of Science, Honorary, Eidgenössische Technische Hochschule, Zurich; Vice-President of Fédération Internationale Pharmaceutique; Member of The Health Service's Committee on Proprietary Medicine; and Honorary Member of Danmarks Apotekerforening.

by DON E. FRANCKE

Importance of the Pharmacy from Business and Management Viewpoint

► MANY FACTORS UNITE TO MAKE TODAY'S PHARMACY department of far greater importance than ever before and, of course, it is the chief pharmacist upon whom the administrator depends for the proper management of this essential facility. Hospital pharmacies are dispensing a high percentage of the prescription drugs produced in America. From 1929 to 1957 this percentage has risen from less than 5 to more than 30 percent or from less than 8 to more than 320 million dollars worth. Predictions are that the volume of drugs dispensed through hospitals will continue to rise steadily with the increase in the nation's population, the increase in the number of citizens over 65 years of age, the greater utilization of hospitals for the treatment of both inpatients and outpatients, and the introduction of more specific, more potent and more complex drugs which must be administered under careful supervision.

Today, about 30 percent of the hospital's commodity budget is spent for pharmaceuticals. This fact alone, and its implications, places heavy responsibilities upon the pharmacist, responsibilities which have an important effect upon the efficient management of the total hospital. Since the pharmacy is one of the hospital's few self-supporting departments, one which often helps to overcome deficits in other service departments, its proper management is of great importance to the hospital's well-being.

Thus, in addition to his prime professional role, the chief pharmacist of each hospital has important management or administrative functions. His is the responsibility to spend wisely the approximately 30 percent of the hospital's commodity budget going for medicinal agents. As a department head, the chief pharmacist must prepare the annual budget for drugs, initiate orders for them, watch price fluctuations, maintain a system of records, keep a careful eye on drug inventories, insure timely delivery and develop a system to distribute medications safely, regularly and efficiently so that they may serve their ultimate purpose. Meanwhile, he must maintain relationships with those who prescribe and administer medications, the members of the medical and nursing staffs. He must advise the administrator who is depending upon him for the efficient management of the department and he must see that patients are promptly and properly served. Finally, he must manage the personnel under his direction so that the work of his department may be accomplished.

Thus, while the hospital pharmacist is first a pharmacist, he functions, in addition, as a combined business manager, accountant, procurement and pricing expert, production and distribution engineer, and liaison officer. These management functions are not only highly important; they are very time-consuming. As one looks at the staffing patterns of hospital pharmacies and relates them to functions, one can seriously question whether the administrative role of the hospital pharmacist has received its full recognition and whether adequate provision or planning has been made for it. In the same vein one may question whether the dual role of the chief pharmacist is fully recognized or whether, on the one hand there is neglect of management functions at the expense of professional functions or neglect of professional functions at the expense of management functions or, more seriously, whether both functions suffer because of failure to plan properly for their fulfillment.

One of the first steps in approaching this problem is to accumulate sufficient records so as to be able to arrive at a reasonable estimate of the measurable and non-measurable workload of the department. One can measure the number of prescriptions and requisitions filled, number of items manufactured and prepackaged, number of purchase requisitions prepared, etc. Other functions, such as time spent in committee meetings, preparing reports, giving information on drugs, interviewing detail men, etc. are more difficult to measure but are, nevertheless, time consuming. When basic records which can be used to approximate workloads are lacking, the chief pharmacist often has a difficult time justifying a justifiable need for additional personnel. As a result, pressure often builds up and the safety valve is to curtail either management or professional functions, and often both. This sets up a vicious cycle which is difficult to break—and when the chief pharmacist tries to break it the first request of his administrative superior is for records to support his claim of need for more personnel.

Greater recognition must be given to the role of the pharmacist as the head of an important department of the hospital, one in which well balanced emphasis must be given to both the professional and management roles of the pharmacist. At the same time the pharmacist, himself, must lead the way by more fully recognizing his dual professional and management functions and in preparing himself to do the jobs which are his as a department head and as a professional man.

A French military pharmacist during the Napoleonic era in dress uniform of the état-major

THE SCIENTIFIC TRADITION IN FRENCH HOSPITAL PHARMACY

by ALEX BERMAN

I

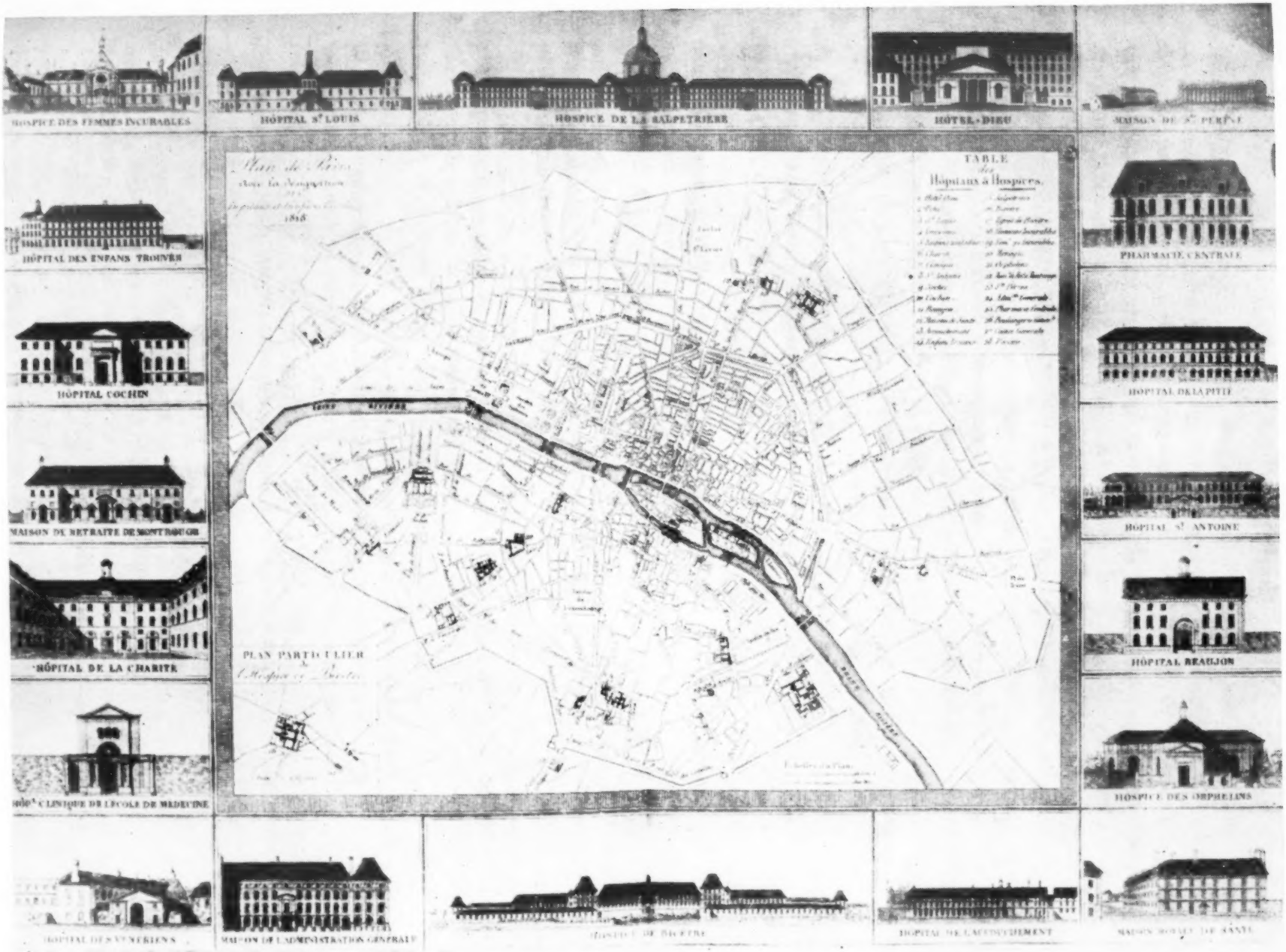
► MODERN HOSPITAL PHARMACY WAS BORN IN PARIS in the early nineteenth century. As a specialty, it constituted one of the unique features in the development of pharmacy in France and was without precedent in other countries, even in Germany, where French pharmacists encountered their most formidable scientific and professional rivalry.[1]

The post-Revolutionary organization of hospital pharmacy in Paris was enormously strengthened by the establishment in 1814 of pharmacy internships in the great hospital system of the French capital.[2] And paralleling the remarkable growth of hospital pharmacy in Paris was the impressive contribution of military pharmacists. A series of decrees passed by the National Assembly and Convention from 1792 to 1796 accorded military pharmacy equal recognition and status with military medicine and surgery.[3]

To understand fully this development, it must be remembered that Paris during the first half of the nineteenth century was one of the great scientific centers of the world and unrivaled for the fame of its medical clinicians. Such scientists as Lamarck, Cuvier, Arago, Thenard, Geoffroy St. Hilaire, Gay-

ALEX BERMAN, Ph.D., is Assistant Professor of Pharmacy, College of Pharmacy, University of Michigan, Ann Arbor, Michigan.

Presented at the Pharmacy Section Np of the American Association for the Advancement of Science, New York City, December 27, 1960.



PLAN DES HOPITAUX ET HOSPICES CIVILS DE LA VILLE DE PARIS (1820).

Fig. 1 A map of Paris indicating the location of all hospital institutions (1820)

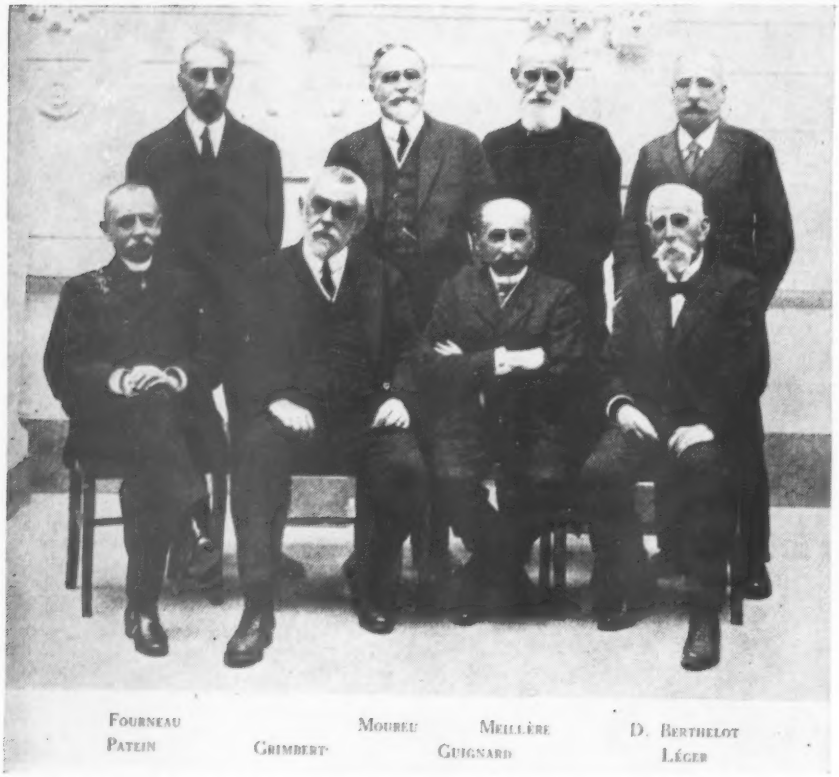


Fig. 2 A photograph of the Pharmacy Section of the Academy of Medicine in Paris taken about 1920. Of the eight men shown above, Meillère, Patein, Grimbert and Léger were career hospital pharmacists, while Fourneau, Moureu and Guignard had been interns in hospital pharmacy

Lussac, Dumas, and distinguished medical clinicians such as Pinel, Laënnec, Louis, Corvisart, and Broussais, attracted international attention. The Ecole Supérieure de Pharmacie, founded in 1803, rapidly acquired world renown under the directorship of the great pharmacist-chemist, Vauquelin and his successors, while the Society of Pharmacists of Paris was recognized as a learned academy, admitting to its membership only pharmacists distinguished for original work. It is against this background that the Parisian pharmacists competed for recognition and attained fame through scientific discoveries. And it is with emotion that J. J. Virey, eminent military pharmacist of the Val-de-Grâce, in describing the scientific ferment of the capital in 1825, assured his fellow members of the Academy of Medicine that the pharmacy section of the Academy would not be outdone in the zealous quest for scientific excellence.[4]

II

From all indications, there was a friendly relationship and mutual respect between the hospital and retail pharmacists of Paris. Foreigners coming to the French capital were impressed with the scientific stature of many owners of *officines* (retail pharmacies). There is the example of Sir Robert Christison, the famous toxicologist, who as a young physician journeyed from Edinburgh to Paris in 1820 to study analytical chemistry under Pierre J. Robiquet in his establishment in the Rue de la Monnaie. For five months, Christison worked intensively with several other foreign students in the laboratory above Robiquet's pharmacy, acquiring techniques and habits of precision which were to be of fundamental importance in his future career as a toxicologist. Christison was amazed by the scientific output of the French pharmacists, by their *officines* and laboratories, so different from those of the apothecaries and druggists of Britain.[5]

Yet, despite the prestige of such renowned nineteenth-century establishments as those of Labarraque, Pelletier, Caventou, Le Cannu, Gobley, Boudet, Dorvault, Limousin and Vigier, early symptoms of a malaise were noticeable even in the opening decade of the century.[6] The French *pharmacien* lacked the economic security of the German *Apotheker*. The legal and economic structure of German pharmacy, based on the limitation of pharmacies, government price-fixing, and the system of privileges and concessions, all non-existent in France, was the envy of many French pharmacists. The typical observation that "La considération scientifique et sociale des pharmaciens allemands est due à la limitation et la repartition des officines," pervaded French literature.[7] Unfortunately, as the century wore on, the French *officine* as a pro-

fessional and scientific center tended to be undermined by a number of factors. There was the unhealthy competition resulting from the proliferation of *officines* and the large number of second-class pharmacists created in the provinces by the *jurys médicaux*. Legal loopholes in the basic pharmacy regulatory act of 1803 (Loi de Germinal, An XI) permitted "la tourbe insolente des charlatans, trop protégée" to sell their nostrums.[8] Most important of all was the rapid growth of prefabricated specialty medications which eliminated a great deal of chemical and pharmaceutical manipulation and changed the character of the apprenticeship. How serious this was to become can be seen from the public outcry in 1872 at a medical congress that "The drug specialty constitutes for most pharmacists a kind of vassalage . . . the specialty is the cause of the decadence of pharmacy."[9] Fortunately for the hospital pharmacists, they were not beset by problems of this kind.

III

How did the hospital pharmacist in early nineteenth-century Paris differ from his monastic forbears and his predecessors of the eighteenth century? For one thing, he was a lay practitioner and not a member of a religious order.[10] Unlike the English hospital apothecary of the eighteenth and early nineteenth century, he did not assume the dual role of pharmacist and minor medical practitioner. The Parisian hospital pharmacist was a municipal employee, selected on the basis of a competitive examination (*concours*) and, after 1814, recruited from those having completed an internship in hospital pharmacy. The internship became more and more important during the course of the century, not only for staffing hospital pharmacies but also in stimulating young pharmacists to become scientists.[11] This new hospital pharmacist was generally oriented toward research and was often an excellent analytical chemist working in the fields of biochemistry, toxicology, and hygiene. Thus, with the passing of the years, a tradition of scientific eminence was established, and we see the hospital pharmacists of Paris acquiring advanced degrees, becoming members of learned societies and professors in the various Faculties, making original discoveries, and publishing in learned journals.

Before discussing the relationships of these new hospital pharmacists with the new clinicians during the first half of the nineteenth century, it is interesting to note the vivid characterization of the revolution in medicine, as given by Professor Ackerknecht, the foremost authority on the Paris Clinical School:

> What a welter of transformations! From "observation" of the patient to methodical examination, from manifestation to underlying lesions, from general picture to the local aspect, from humoral pathology to solidism, from the individual case to the statistical

Fig. 3 The military pharmacist F.Z. Roussin (1827-1894) in his laboratory at the Val-de-Grâce in Paris

Fig. 4 Nicolas Louis Vauquelin (1763-1829)

Fig. 5 Emile Bourquelot (1851-1921)

Fig. 6 J. A. A. Parmentier (1737-1813)

> appraisal of numerous cases, from the odd autopsy to routine postmortem! No one even remotely acquainted with the history of medicine can fail to recognise the truly revolutionary transformation effected here. And these changes were in fact by-products of a greater and more general upheaval of the French Revolution.[12]

Yet most representatives of the Paris Clinical School were reluctant to apply the basic sciences to medicine, were suspicious of theorizing, and refused to correlate bedside and autopsy findings with laboratory experimentation, despite the examples of Magendie and Claude Bernard in experimental physiology, pharmacology and therapeutics. This preoccupation with "hospital medicine" and failure to make a timely transition to "laboratory medicine" led, as Ackerknecht has shown, to the German capture of medical leadership during the second half of the nineteenth century.[13] The vacuum thus created in Paris by the absence of clinicians from the laboratory, was filled by pharmacists and chemists, and it was to medical biochemistry that many hospital pharmacists were drawn.

The earliest leaders in the development of biochemistry in nineteenth-century France were the versatile and ubiquitous Fourcroy and his eminent pupil and collaborator, Vauquelin. The Germans like to refer to Vauquelin with deference as "der französische Klaproth."[14] It is true that the pharmacists Vauquelin and Klaproth were probably the best analytical chemists of their time, but Vauquelin differed from his German colleague in his biochemical investigations, *e.g.*, of blood, sweat, renal calculi, tears, brain tissue, bile, urine, etc.—a field which Klaproth and most German pharmacists hardly touched. The tremendous wave of interest generated in biochemistry and related chemical fields by Vauquelin is reflected in the work of his students, the pharmacists Bouchardat, Caventou, Robiquet, Chevallier, Pelletier, Robinet, Quesneville, the chemists Payen, Thenard, and Chevreul, and the toxicologist Orfila.[16]

As late as 1854, one prominent writer complained bitterly that although chemistry had made tremendous strides since Lavoisier, many physicians still wanted to "banish forever the science of chemistry from the sanctuary of Hippocrates."[17] But when later in the century, the shift to laboratory medicine had begun, hospital pharmacists had long been prepared to collaborate and render assistance. It has been pointed out by Guillot that the development of medical biochemistry in France is largely due to the contributions of pharmacists, and that by the beginning of the twentieth century many of the most prominent names in this specialty were those of pharmacists.[18]

By 1900, the historian of pharmacy, André-Pontier, could announce with conviction: "One can say that they [the hospital pharmacists] represent at the present time the scientific élite of the pharmacists in France for the excellent reason that the community pharmacist,

Méthode d'extraction des pigments d'origine animale. — Applications diverses du sulfate d'ammoniaque; par M. C. Méhu.

(Note lue à l'Académie nationale de médecine le 25 juin 1878).

Dans la plupart des procédés d'extraction des matières colorantes des liquides de l'organisme, on se sert de sels de plomb pour fixer le principe colorant, d'agents oxydants ou réducteurs, d'acides et d'alcalis et l'on fait intervenir l'action d'une température plus ou moins élevée. Ces conditions, de tout temps reconnues défectueuses, ont souvent donné des produits de réaction très-différents des principes colorants naturels.

La méthode que je vais décrire permet, sans l'emploi de la chaleur (...niques, d'extraire presque instantanément ... ...ication la plupart des pri... ment l... Pou... d'amm... dulé ...

ARCHIVES

DE

PHYSIOLOGIE

DE

THÉRAPEUTIQUE ET D'HYGIÈNE

SOUS LA DIRECTION

DE

M. BOUCHARDAT,

Professeur d'hygiène à la Faculté de médecine de Paris.

N° 2. — Octobre 1854.

MÉMOIRE

SUR

L'ACTION PHYSIOLOGIQUE ET THÉRAPEUTIQUE DES FERRUGINEUX,

Par T.-A. QUEVENNE.

On souscrit à Paris,

CHEZ GERMER BAILLIÈRE, LIBRAIRE-ÉDITEUR.

RUE DE L'ÉCOLE-DE-MÉDECINE, 17.

A LONDRES ET A NEW-YORK, Chez H. Baillière. | A MADRID, Chez Ch. Bailly-Baillière.

1854.

HYGIÈNE

PHILOSOPHIQUE,

APPLIQUÉE

A LA POLITIQUE ET A LA MORALE.

Par J. J. VIREY,

NOUVELLE ÉDITION,

AUGMENTÉE DE NOTES.

Souvenirs

AUGUSTE BEHAL

(1859-1941)

I. Son agrégation II. La notation atomique

par Marcel DELÉPINE

Membre de l'Institut

Mon intention n'est pas de rappeler ici toute la brillante carrière d'Auguste Béhal. Elle a été déjà admirablement exposée par M. Maurice-Marie Janot, lors de la séance publique annuelle de l'Académie de Pharmacie, le 7 janvier 1959, et sera certainement encore, dans le *Bulletin de la Société Chimique de France,* l'objet d'une notice ...cernant son œuvre scientifique étayée de la liste de se... ...s publications.

... une époque qui avoisine le centenaire de la nais... ...t simplement de faire part à notre société de ...s personnelles remontant à un passé

... que j'entendis le nom de ... singulière. J'avais ... ...sse) et inte... avait

RECHERCHES SUR LA COMPRESSIBILITÉ DES LIQUIDES;

PAR M. GRASSI.

Beaucoup de physiciens ont cherché à déter...iner la compressibilité des liquides. Les résultats obtenus par MM. Œrsted, Colladon et Sturm sont consignés dans les ouvrages de physique. Le procédé employé consiste, comme on sait, à enfermer le liquide à comprimer dans un gros thermomètre dont la tige, très-fine, est divisée en parties d'égale capacité, et dont on connaît le rapport avec le volume du réservoir. Cet appareil, connu sous le nom de *piézomètre,* ... une éprouvette pleine d'eau, et munie d'une ... de laquelle on le met en ... compr

SOMMÉ (Albert-Eugène).

Chlorure de zinc en cylindre. *J. P. C.* (3), 38, 266, 1860.

SONNERAT (Charles-Émile).

Eau oxygénée médicinale. *J. P. C.* (5), 7, 488, 1883.
Solutions cupriques pour la recherche des glucoses. *J. P. C.* (5), 8, 28, 1883.

SONNIÉ-MORET (Louis-Abel-Alexandre). Né à Clamecy, le ... tembre 1855. Docteur en médecine; Membre de la Société d... macie; Pharmacien des Hôpitaux (1884) : *Beaujon* (1er avril ... 16 avril 1887); *Enfants-Malades* (16 avril 1887-1er juillet 1910); ... macien honoraire.

Recherche toxicologique de la cocaïne. *J. P. C.* (5), 27, 390, 1893; *R. P.* (3), 8, 25...
L'ammoniaque urinaire; son dosage; rapport de l'azote de l'ammoniaque avec l... de l'urée. *R. P.* (3), 10, 199, 1898; *Méd. Sc.*, 1898.
A propos du dosage de l'eau oxygénée. *R. P.* (3), 11, 289, 1899.
A propos du procédé de dosage de l'acide urique dit Salkowski-Ludwig. *R. P.* (3), 97, 155, 1900.
Recherche de petites quantités de mercure dans l'urine. *R. P.* (3), 10, 255, 1904.
De la recherche toxicologique de la cocaïne. *Th. D. M.*, Paris, 1893.
Éléments d'analyse chimique médicale appliquée aux recherches cliniques. Paris, 1897.

SOUBEIRAN (Eugène), ✠. Né à Paris le 24 mai 1797, mort le 17 no... vembre 1858. Docteur en médecine (1853); Professeur de Physique à l'École de Pharmacie de Paris (1834); Professeur de Pharmacologie à l'École de Médecine de Paris (1853); Membre de l'Académie de Médecine (1853); Membre de la Société de Pharmacie (1824); Président (1840 et 1857); Pharmacien des Hôpitaux (1823) : *Pitié* (juin 1823-mars 1832); *Pharmacie Centrale* (1er mars 1832-17 novembre 1858).

Biographie. — Wurtz. Eloge de Soubeiran. Séance de rentrée de la Faculté de Médecine, 1858. *J. P. C.* (3), 34, 431, 1858; 36, 436, 1859; 37, 39, 1860; *R. P.* (1), 10, 163, 1859-60; *J. C. M.* (4), 5, 29, 748, 18... *Centenaire Jo... Corlieu. C... Rappo... 27, 18...* ...acie et Chimie, 51; ...Faculté de Médecine, 347, 1896. *Bull. Ac. M. Paris*, 34, 173, 1858. ...aux du Conseil d'Hygiène et de Salubrité publique de la Seine.

... propriétés médicales du séné du Sénégal. *J. P. C.* (3), ... *Thér.*, 6, 25, 1824.
...mences émulsives. *J. P. C.* (2), 12, 52, 182...
... et sur le suc de *Jatropha Curcas*. *J. P. C.* (2), 14, ...
... Euphorbiacées. *J. P. C.* (2), 15, 501, 1829.
... mémoire de M. le Dr Hancock, sur la salsepa... *J. P. C.* (2), 17, 619, 1831.
...strales dont le tartrate de potasse est la ...
...rgeat. *J. P. C.* (2), 19, 243, 1833.
... de ratanhia. *J. P. C.* (2), 19, 396, 1833; ... 393, 1834; *Bull. Thér.*, 6, 312, 1834;

THOMAS (Charles-Eugène). 1854-1885. Lauréat des hôpitaux et de l'École supérieure de Pharmacie.

Recherche dans les vins d'une nouvelle matière colorante dérivée de la houille. *R. P.* (3), 10, 64, 111, 1882.
Recherche du rouge Bordeaux dans les vins (avec Guichard). *J. P. C.* (5), 5, 316, 1882; *R. P.* (3), 10, 197, 1882.
Coloration artificielle d'un quinquina par l'ammoniaque (avec Guichard). *R. P.* (3), 10, ...
J. P. C. (5), 6, 463, 1882.
Coloration des pains de gluten en amidon. *R. P.* (3), 10, 333, 1882.
Richesse des vins ... *R. P.* (3), 11, 400, 1883.
... 1883; *J. P. C.* (5), ... 12, 63, 1885.
Tannin falsifié. *R. P.* (3), 12, 265, 1881; *J. P. O.* (5), 10, 210, 1884.
Recherche de l'acide salicylique dans les vins.
Recherche de l'émétique. *R. P.* (3), ...
Falsification de ... la codéine. *R. P.* (3) ...
Sur un sel trouvé dans la codéine.

THOMIER (Maurice), ✠. Né à Creil, en mai 1882. ... Mouy (Oise), le 7 novembre ...

Réactions colorées de différents bacilles. Action des hypochlorites sur des fausses ... pleurales. *Bull. Soc. Thér.*, 24, 13 mars 1919.

CHIMIE

APPLIQUÉE

A LA PHYSIOLOGIE

ET

A LA THÉRAPEUTIQUE

PAR

M. le Docteur MIALHE,

PHARMACIEN DE L'EMPEREUR,

Professeur agrégé à la Faculté de médecine de Paris, etc.

« Si les expériences ne sont pas dirigées par » la théorie, elles sont aveugles; et si la théorie » n'est pas soutenue par l'expérience, elle devient » trompeuse et incertaine. »

(BACON.)

devait apporter la preuve définitive des constitutions admises. Ce problème, abordé par Moureu en 1895, fut résolu définitivement par Béhal et Tiffeneau.

Moureu établit d'abord, par synthèse directe, que l'eugénol est bien un allylgaïacol, il montra en effet qu'on peut obtenir le méthyleugénol en traitant le vératrol par l'iodure d'allyle et la poudre de zinc, il reproduisit également l'isosafrol en décomposant par la chaleur l'acide méthylène-homocaféique

$$CH^2O^2 - CH^3 - CH = C\begin{smallmatrix}CH^3\\CO^2H.\end{smallmatrix}$$

On doit à Béhal et Tiffeneau la synthèse de l'anéthol et de l'isoeugénol qui résultent de la déshydratation des deux alcools secondaires que l'on obtient en traitant respectivement par l'iodure de méthylmagnésium l'aldéhyde anisique et la vanilline.

Tiffeneau a réalisé, de son côté, la synthèse de l'estragol par réaction du bromure d'allyle sur le dérivé magnésien du ...anisol.

Il faut encore ranger dans la série des phénols ... les diverses oxyanthraquinones qui ont reçu des ... ques. L'acide chrysophanique avait été reconnu ... oxyméthylanthraquinone par C. Liebermann ... titution a fait l'objet de nombreux travaux ... reprises par Léger le conduisirent à ... bien la dioxy 1-8 méthyl-3-an... ...iellement à partir de la chrys... le commerce livre l'un de ... int de vue pharmac... série des oxy... ...t active ... ...oit do... ch...

ROUSSELET (Albert-Émile). Docteur en pharmacie de l'Université de Paris.

Chimisme intestinal des graisses alimentaires et leur dosage en coprologie. *Th. D. Ph.* Paris, 1909; *J. P. C.* (7), 30, 60, 1909.

ROUSSIN (François-Zacharie), ✠. Né à Vieuxvy (Ille-et-Vilaine), le 6 septembre 1827, mort le 8 avril 1894 à Paris. Lauréat des Hôpitaux; Lauréat de l'École supérieure de Pharmacie; Professeur agrégé au Val-de-Grâce; Pharmacien militaire; Directeur de la Pharmacie centrale des hôpitaux militaires; Membre de la Société de Pharmacie.

Biographie. — *J. P. C.* (5), 29, 486, 1894. Balland et Lucet, le chimiste Roussin. Paris, 1908.

Matières colorantes azoïques. — *Plis cachetés déposés à l'Académie des Sciences :*
1° Procédés pour obtenir une nouvelle matière colorante rouge dérivée de la naphtylamine ou de l'acide naphthionique, 1875.
2° Nouvelle matière colorante dérivée de la naphtylamine ou de l'acide naphthionique, 1875.
3° Nouvelle matière colorante dérivée de la naphtylamine, 1875.
4° Nouvelle matière colorante dérivée de la naphtylamine, 1876.
5° Note relative à la production d'un grand nombre de matières colorantes artificielles,
... ouverts le 4 février 1907. Voir leur contenu (in Balland et Lucet, *loc. cit.*, 80, 88.
... cachetés déposés à diverses Sociétés savantes :
... velles matières colorantes rouge-orangé (Société Industrielle de Mulhouse, 5 juin ... ouvert en séance le 30 octobre 1889.)
... elle matière colorante rouge-orangé (Société Industrielle de Mulhouse, 5 juin ... ert en séance le 30 octobre 1889).
... colorantes dérivées de la diphénylamine (Société Industrielle de M... Pli ouvert en séance le 30 octobre 1889).
... matière colorante rouge-orangé (Société Industrielle de Rou... ...7 et publié dans le *Bulletin* de 1887).
3° ... velle matière colorante (Société Industrielle de Rouen, 1... ... publié dans le *Bulletin* de 1887).
... Nouvelles matières colorantes (Société Ind... Retiré le 17 janvier 1897).
4° Nouvelles matières colorantes artificielles (Société In... 7 janvier 1897).

MÉMOIRES LUS.

...IMIE. — *Études de physiologie végétale faites au moyen de l'acide arsénieux;* par M. Ad. Chatin. (Extrait par l'auteur.)

(Commissaires, MM. Dumas, Ad. Brongniart, Regnault.)

« Les procédés si parfaits de la science chimique pour découvrir les quan... tités les plus faibles des composés arsenicaux, procédés que j'ai déjà mis à contribution pour des recherches de physiologie animale, se prêtent encore mieux à des études sur les plantes; car on n'a pas à redouter, dans la botanique, ces effets de la sensibilité qui rendent toujours si délicates les expériences sur les animaux.

» C'est (je dois bien établir ce point) comme *moyen* et non comme *but* d'expérimentation que j'ai fait choix de l'acide arsénieux; que l'Académie des Sciences daigne cependant ne pas prendre cette déclaration dans un sens trop absolu, car il est vrai de dire qu'en donnant à l'arsenic la préférence sur l'antimoine, j'ai eu en vue d'éclairer, autant qu'il dépendrait de moi, le CHAU-

Discussion sur l'action du perchlorure de fer dans le purpura.

M. Poggiale : Notre honorable collègue M. Trousseau a soulevé dans deux discours pleins d'intérêt, et prononcés avec son esprit et sa verve ordinaires plusieurs questions sur lesquelles je désire appeler l'attention de l'Académie. Notre éminent collègue a prêté aux chimistes des opinions singulières sur le rôle du fer comme agent thérapeutique; il a parlé des chimistes et des chimiâtres, des forces vitales, du camp des chimistes et de celui des vitalistes, et d'une foule d'autres choses.

Tant qu'on est sous le charme de la parole spirituelle de M. Trousseau, on se sent malgré soi entraîné vers lui; mais si l'on se demande, lorsque cette sorte de fascination a cessé, ce qu'il y a au fond de ce langage harmonieux, on ne tarde pas à s'apercevoir que M. Trousseau n'a aucune conviction, et que ses assertions, souvent contradictoires, sont dépour... de preuves sérieuses.

... de reconnaître cependant que, s'il est scep... sciences qu'il a le mieux étudiées et qu'il a enseignées, il repousse sans aucune réserve le ... les sciences physico-chimiques, qu'il ne connaît ... plutôt qu'il déclare ne pas connaître. Sa seule convic... donc une négation absolue des grands travaux qui ... accomplis dans ces sciences depuis plus de soixante... ...ns.

...ans vouloir traiter à fond aujourd'hui, à propos du rapport de M. Devergie, les graves questions qu'il a soulevées, ... importe, je crois, de dire ce que je pense sur quelques-unes d'entre elles.

Le fer a joué un grand rôle à toutes les époques de la science. La recherche de la médecine universelle, de la pierre philosophale, de la transmutation des métaux, et les admirables découvertes de Lavoisier, sont en quelque sorte liées à l'histoire du fer et de ses combinaisons.

Aujourd'hui, l'utilité des médicaments ferrugineux ne pa-

engaged in commercial struggles, has no longer time as he did formerly to devote himself to purely scientific research."[19]

IV

Historians of pharmacy outside of France have yet to appreciate fully the significant interrelationships of French pharmacy with science and medicine, and to evaluate carefully the work of such important representative hospital pharmacists as Apollinaire Bouchardat (1806-1886), Camille Méhu (1835-1887), Louis Mialhe (1807-1886), G. A. Chatin (1813-1901), J. J. Virey (1775-1846), and Auguste Béhal (1859-1941). The contributions and interests of these and other pharmacists in France frequently reveal a remarkable versatility and depth generally overlooked, or at best only perfunctorily noted.

One reason for this oversight has been the customary emphasis on the brilliant discoveries of such men as Caventou, Pelletier, Robiquet, Ballard, and Moissan with respect to phytochemistry, halogens and therapeutic agents, to the exclusion of pharmacists working, for example, in the fields of biochemistry, public health and hygiene. This oversight can also be linked to the failure to recognize an important anomaly in French pharmacy—that many pharmacists were biologically and medically oriented. Among hospital pharmacists and members of the pharmacy section of the Academy of Medicine were many who possessed doctorates in medicine. This does not mean, however, that these pharmacists practiced medicine, that they were clinicians, or that they had surrendered their identity as pharmacists, as the examples of Bouchardat, Méhu, Mialhe, Chatin, and Virey illustrate.

For some twenty-three years (1832-1855), Bouchardat had served as a hospital pharmacist, mainly at the Hôtel-Dieu. He had obtained his doctorate in medicine in 1832, subsequently becoming a member of the Academy of Medicine (1850), then president of that learned body (1866), president of the Society of Pharmacy (1863), and professor of hygiene at the Faculty of Medicine of Paris (1852). A prolific and versatile research worker, Bouchardat's investigations cover such fields as biochemistry, physiology, therapeutics, physical chemistry, organic chemistry, analytical chemistry, toxicology, phytochemistry, hygiene, agricultural chemistry and materia medica. His most important contribution was probably in the field of hygiene. Ackerknecht states that he "influenced French hygiene deeply through his etiological approach in the second half of the century (Bouchardat was one of the early and rare medical partisans of Pasteur) and won deserved fame for his work on diabetes . . ."[20] On the subject of diabetes, Garrison and Morton have described his work as follows: "Bouchardat used the fermentation test, polariscope, and copper solutions for detection of diabetes; he substituted fresh fats for carbohydrates, advised the avoidance of milk and alcohol, invented gluten bread and advocated the use of green vegetables. In fact, he devised the most rational method of treatment of diabetes up to his time."[21]

Only in 1956 did the prominent American biochemist, E. V. McCollum, point out that standard textbooks on biochemistry and reputable monographs on proteins had failed to mention Camille Méhu, "the man who made one of the most important discoveries in the entire history of protein investigations."[22] A contemporary of Bouchardat, Méhu chose hospital pharmacy as his career. His most important work was in biochemistry, and his chief discovery was demonstrating that protein solutions when saturated with ammonium sulfate resulted in complete precipitation of the proteins without changing their nature. He applied this method with success in precipitating pigments from urine, proteins from milk, bile acids, mucin and other albuminous substances. Méhu obtained his M.D. degree in 1865, was later admitted to the Academy of Medicine (1880) and became president of the Society of Pharmacy (1878).

It was the unfortunate fate of Louis Mialhe to be dwarfed by the genius of Magendie and Claude Bernard. Yet Mialhe deserves recognition for original work in physiological chemistry and therapeutics. Pharmacist for eight years at the Hôpital Saint Antoine (1834-1842), he obtained his doctorates in science and medicine, became a member of the Academy of Medicine, president of the Society of Pharmacy, and subsequently opened an important *officine* in Paris. Among his contributions was his isolation of ptyalin ("diastase animale ou salivaire") and description of the action of this enzyme on starch.[23] His ambitious attempt to interest a large number of pharmacists in physiological and pharmacological studies applied to therapeutics was not successful. But he did succeed in rallying a small number of fellow pharmacists in the *Société de Thérapeutique* of which he was a prominent member.[24]

Gaspard Adolph Chatin was appointed a hospital pharmacist in Paris in 1841, first at the Hôpital Beaujon where he served for eighteen years, and then at the Hôtel-Dieu where he worked for another fifteen years. His investigations were primarily in various aspects of botany, but he also did work in toxicology, hygiene and animal physiology. His interest in the iodine content of plants led him to develop a micromethod for measuring iodine, which he applied to water, air, and soil. As a result of this work, Chatin advanced the theory (1851-52) that endemic goiter was due to the lack of iodine.[25] Chatin obtained his doctorate in science (1840), doctorate in medicine (1844), became president of the Society of Pharmacy (1848), member of the Academy of Sciences and subsequently president (1897), president of the Academy

Fig. 1. An 18th century engraving of the Val-de-Grâce in Paris, an important center for instruction in military medicine and pharmacy

of Medicine (1876), and finally Director of the Ecole (1873-1886).

J. J. Virey belongs to that brilliant group of military pharmacists assigned to the Val-de-Grâce in Paris, which included Antoine Louis Brogniart (1742-1804), Lodibert (1772-1840), Sérrullas (1774-1832), Millon (1812-1867), Roussin (1827-1894), and Poggiale (1808-1879). Retiring from military service in 1812, Virey obtained his doctorate in medicine in 1814, becoming a member of the Academy of Medicine (1823) and president of the Society of Pharmacy (1830). He was a member of the editorial board of the *Journal de Pharmacie* (1812-1846) and was called to the Chamber of Deputies in 1825. Virey's investigations and numerous writings range over a variety of subjects, notably natural science, pharmacy and hygiene.[26] What made Virey unique among French pharmacists was his interest in the philosophical implications of the material he investigated. He countered the philosophy of Cabanis and the Ideologues with a vitalistic and eclectic philosophy of his own.[27] Unlike most vitalists of the period, as well as the followers of Cabanis, Virey advocated strongly the application of chemistry to medicine.[28] In his discussion of hygiene, Virey attempted to show relationships with sociological, political and ethical factors.[29]

The first four men mentioned had been interns in hospital pharmacy. How influential an outstanding hospital pharmacist could be in shaping the scientific orientation and careers of his interns can be seen in the case of Auguste Béhal. It was under his direction that a group of brilliant young interns in pharmacy at the Hôpital du Midi at the end of the nineteenth century, were initiated into the new chemical nomenclature of Wurtz and Friedel, thus breaking with the orthodox tradition of Berthelot and his followers at Ecole Supérieure de Pharmacie.[30] Béhal was subsequently admitted to the Academy of Medicine (1907), became president (1922), and was elected to membership in the Academy of Sciences (1920), becoming president in 1939. Many other such examples of versatility and scientific contributions by French hospital pharmacists can be cited.*

Military pharmacy provided a significant reservoir of original scientific work in France, together with the pharmacies of the large civil hospitals, the faculties of pharmacy, and certain renowned *officines*. The scientific tradition established in military pharmacy during the 18th century by Guéret, Bayen, the elder Pelletier, and Parmentier, was carried on with distinction in the succeeding century by such figures as Sérullas, Laubert, Lodibert, Virey, Millon, Poggiale and Roussin.[31] This was demonstrated in a memorable debate in the Academy of Medicine during 1873 when the pharmacists Poggiale, Bussy, Félix Boudet, and N. T. Gobley vigorously opposed the surgeons and physicians

of the Academy led by Paul Broca, F. H. Larrey and Legouest on the question of the subordination of military pharmacy to military medicine.[32] In this historic struggle of French military pharmacists against subordination, the most significant factor was the impressive display of their scientific accomplishments—a display without precedent in pharmacy of the English-speaking world, and unmatched by military pharmacy in other European countries at that time. It was in this debate that the renowned chemist, Jean Baptiste Dumas, interceded on behalf of the pharmacists and made an observation which has since been frequently quoted by historians of French pharmacy: "To produce eminent chemists, it is necessary to have fertile soil, and it is pharmacy which has this. That is why I have long been led to regard the learned profession of pharmacist as a national asset that must be preserved."[33]

V

In recent years, two distinguished French hospital pharmacists, Jean Cheymol and Marcel Guillot, heirs to the scientific tradition that has been described, have discussed contemporary French hospital pharmacy at some length.

Cheymol has concluded that a pharmaceutical élite is still emerging among those who have competed successfully and have been selected to pursue a professional career in hospital pharmacy. In his words:

> Selected relatively early by passing difficult examinations, he [the pharmacist] is able to acquire a wide scientific background by attendance at various scientific institutions (Faculty of Sciences, of Medicine, etc.).
>
> Once appointed, freed from the restraints of competition and daily financial problems, he is able in his secure routine as a functionary to forge ahead on two different levels simultaneously:—his hospital work will keep him in contact with the realities of life, sickness, and death, and will prevent him from straying into speculative research; his scientific research and teaching will become imbued with a practical sense acquired at the hospital.
>
> This combination will make him a well-balanced man, predestined for the role of advisor, listened to by the physician, by the administration, and by his students for the greater good of all.[34]

Cheymol's conclusions underscore the basic but essentially applied nature of research carried on by French hospital pharmacists during the last 150 years and the deep influence of the hospital and clinical setting.

In his discussion of the evolution and present role of the French hospital pharmacist as the director of medical analytical laboratories, Marcel Guillot has pointed to a fascinating possibility and challenge in modern France:

> . . . Indeed, one may wonder if the day will come when there will actually be *two* Chief Pharmacists in the hospital: one at the head of the pharmacy service proper, the other directing the central biological laboratory. Such a situation exists at the present time, for example, at Saint Anne's psychiatric hospital in Paris. At the same time, one difficulty must be overcome: before such a plan can be generally adopted, the pharmaceutical profession must accept the creation of a new professional specialty, that of pharmacist-biologist, unless still a third profession is to be born alongside that of physician and pharmacist, the profession of Biologist . . .
>
> Thus the problems of the future evolution of hospital pharmacy in France and of its connection with the medical analytical laboratory are linked in part to the larger problem of the future of biological education.[35]

In short, the volume and complexity of clinical laboratory work in French hospitals have become so great that the hospital pharmacist at present is encountering serious difficulty in filling his traditional role of joint director of pharmacy and medical biochemical services.

An answer to a query from this writer to Professor Guillot with respect to the present situation in France may be summed up as follows:[36]

1. There is a growing tendency to lump together biochemistry as traditionally treated by French pharmacists with biophysics and physiology or bacteriology, and a mounting pressure by physicians to take over active direction of biological laboratories. In this, the physicians have legal support as a result of legislation passed in 1946.

2. On the other hand, new legislation now under consideration, if passed, would permit the creation of the specialty of *Biologiste* open to physicians and pharmacists without distinction. This would entail specialized training by the physician and the pharmacist to qualify for practice in this specialty, and appointments in various institutions would be made on the basis of a competitive examination with no prior bias in favor of the physician.

At this juncture it is conceivable that a fairly large number of French pharmacists may sometime in the future become *Biologistes,* abandoning strictly pharmaceutical functions for biochemistry, biophysics, physiology and bacteriology. But, as Guillot pointed out in 1952, this issue must be viewed within a larger framework of the future of biological training in France, in which the role of the Faculties of Pharmacy and other educational institutions must be decided.

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*Certainly deserving of more attention by historians are the hospital pharmacists J. F. Demachy (1728-1803), N. E. Henry (1769-1832), N. J. B. G. Guibourt (1790-1867), J. P. Boudet (1748-1828), E. Soubeiran (1769-1858), T. A. Quevenne (1806-1855), F. Foy (1793-1867), E. Filhol (1814-1883), M. J. Fordos (1816-1878), J. A. C. Grassi (1818-1887), J. A. Regnauld (1820-1895), J. Personne (1816-1880), M. V. E. Baudrimont (1821-1885), F. A. C. Leconte (b. 1819), and later practitioners in hospitals such as Bourgoin, Bourquelot, Guerbet, Léger, Prunier, Hérissey, Grimbert, Tiffeneau and Delépine.

Notes and References

1. Alexander Bussy (1794-1882), Director of the Ecole Supérieure de Pharmacie in Paris, reported in a study of German pharmacy that "With a few exceptions, the medications necessary in [German] hospitals are not prepared in the hospitals; they are prepared for these establishments by community pharmacists." Bussy, A.: de la pharmacie en Allemagne. *Journ. de Pharm. et de Chimie,* (1853) 3 s., 23:110.

2. The monumental work by Albert Goris and his associates, *Centenaire de l'internat en pharmacie des hôpitaux et hospices civils de Paris,* Paris, 1920, is still the best single reference source on French hospital pharmacy from the time of the Revolution to 1918.

3. Blaessinger, Edmond: *Quelques grandes figures de la pharmacie militaire.* Paris, 1948, pp. 18-23.

4. "C'est donc à ce foyer éclatant que la pharmacie moderne s'est éclairée à Paris principalement, avec le concours de l'école et de la société des pharmaciens, et qu'elle a mérité l'honneur de former une troisième Section dans cette académie. Soeur émule, mais non rivale de la médecine et de la chirurgie, elle espère les égaler en ardeur pour les sciences . . ." Virey, J. J.: Discours sur l'histoire et les progrès des sciences pharmaceutiques [Première séance publique de la Section de Pharmacie, mars 1825] *Mém. Acad. de Méd.,* Paris (1828) I, 334.

5. Christison, Robert: *The Life of Sir Robert Christison, Bart.* William Blackwood and Sons. Edinburgh and London, 1885, I, 267.

6. Cadet, C. L. Considérations sur l'état actuel de la pharmacie. *Bull. de Pharm.* (1809) *1*:10-11.

7. *Graux, Miramont: Le passé, le présent et l'avenir de la pharmacie en France ou considérations sur les causes de la décadence de la pharmacie, ainsi que de la désuétude du codex, et sur les moyens d'y remédier.* Paris. A la Pharmacie Centrale de France, 1863. p. 156.

8. Cadet, *op. cit.,* p. 10.

9. Vidal, M.: Réorganisation de la pharmacie et élévation du niveau des études professionnelles. Congrès médical *de France 1872,* Paris, 1873, p. 571.

10. The dominating role of nuns in the management of hospital pharmacies in Paris before the Revolution is mentioned by Maurice Bouvet in his series of articles on "Les origines de la pharmacie hospitalière à Paris" in *La Pharmacie Française,* Sept., Oct., Nov., Dec., 1934; March 1935; Sept., Oct., Nov. 1938. See also Massy, R.: A l'apothicairerie des Invalides: le conflit de 1772 entre l'administration et les Filles de la Charité. *Rev. d'Hist. de la Pharmacie* (1954) 42:315-324.

11. Valette, G.: Evolution du rôle de l'internat en pharmacie dans les hôpitaux de Paris depuis un siècle. *Rev. de l'Assistance Publique* (1954) July-Aug., pp. 1-8. Hazard, R.: L'internat en pharmacie dans les hôpitaux de France: *La Pharmacie Française* (1951) Sept., *55*:115.

12. Ackerknecht, E. H.: Paris hospitals around 1800 - a new era in medicine. *Ciba Symposium,* (1959) *7*:99.

13. Ackerknecht, E. H.: *La médecine à Paris entre 1800 et 1850.* Les Conférences du Palais de la Découverte. Série D. No. 58, Paris, 1958, p. 16.

14. Dann, G. E.: *Martin Heinrich Klaproth* (1743-1817) Akademie Verlag, Berlin, 1958, p. 153.

15. Chatagnon, C. [Mlle.] et Chatagnon, P. A.: Les pionniers francais de la chimie cérébrale: les citoyens A. F. de Fourcroy (1755-1809) et L. N. Vauquelin (1763-1829). *Annales Médico-Psychologiques* (1954) 2:14-39.

16. *Ibid.,* p. 22.

17. Figuier, L.: De l'importance et du rôle de la chimie dans les sciences médicales. *Journ. de Pharm. et de Chimie,* (1854) 3 s., *25*:269.

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19. André-Pontier, L.: *Histoire de la pharmacie.* Paris, 1900, p. 551.

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21. *Garrison and Morton's Medical Bibliography.* 2nd ed. New York 1954, p. 345.

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23. *Comptes rendus de l'Académie des Sciences.* (1845) *20*:954-959; 1485-1488.

24. Mialhe, L.: Coup d'oeil sur le passé et l'avenir de la pharmacie et de la thérapeutique. *Bulletins et Mémoires de la Société de Thérapeutique,* première série, 1871-2. Paris (1875) *4*:155-175.

25. Cf. Salter, W. T.: A background for biological studies with radio-iodine. *Science* (1949) 109:453, and Greenwald, I.: A note on Chatin and the hypothesis that endemic goiter is due to the lack of iodine. *Science* (1950) *111*:501-502.

26. An enlightening review of Virey's life and work was given by Eugène Soubeiran: Discours prononcé par M. Soubeiran, aux funérailles de M. Virey. *Journ. de Pharm. et de Chimie* (1846) 3 s., *9*:277-282.

27. For a discussion of Virey's philosophy see Damiron, J. P.: *Essai sur l'histoire de la philosophie en France au dix-neuvième siècle.* Brussels, fourth ed., 1832, pp. 241-257.

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29. See Ackerknecht's study cited above on "Hygiene in France, 1815-1848," p. 129.

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32. This momentous debate took up six sessions in the Academy of Medicine, and can be followed in the *Bulletin de l'Académie de Médecine,* (1873) ser. 2, vol. 2:

1. Séance du 8 juillet 1873, pp. 768-792
2. Séance du 15 juillet 1873, pp. 801-848
3. Séance du 18 juillet 1873, pp. 849-892
4. Séance du 22 juillet 1873, pp. 897-942
5. Séance du 29 juillet 1873, pp. 945-981
6. Séance du 5 août 1873, pp. 983-984; 988-998.

33. *Ibid.* p. 593.

34. Cheymol, J.: La pharmacie hospitalière française. *Techniques Hospitalières* (1956) no. 128, 1-9.

35. Guillot, op. cit., p. 88.

36. Personal communication from Professor Guillot (November 16, 1960).

Sources of Illustrations

Fig. 1 Engraving by J. E. Thierry. Reproduced in *Deux Siècles d'Histoire Hospitalière de Henri IV à Louis-Philippe (1602-1836)* Paris, 1947, by Pierre Vallery-Radot. Original in the Archives of the Assistance Publique of Paris.

Fig. 2 *Centenaire de l'Académie de Médecine 1820-1920,* Paris, Masson et Cie. Éditeurs, 1921.

Fig. 3 Balland A. and Luizet D.: *Le Chimiste Z. Roussin,* Paris, 1908.

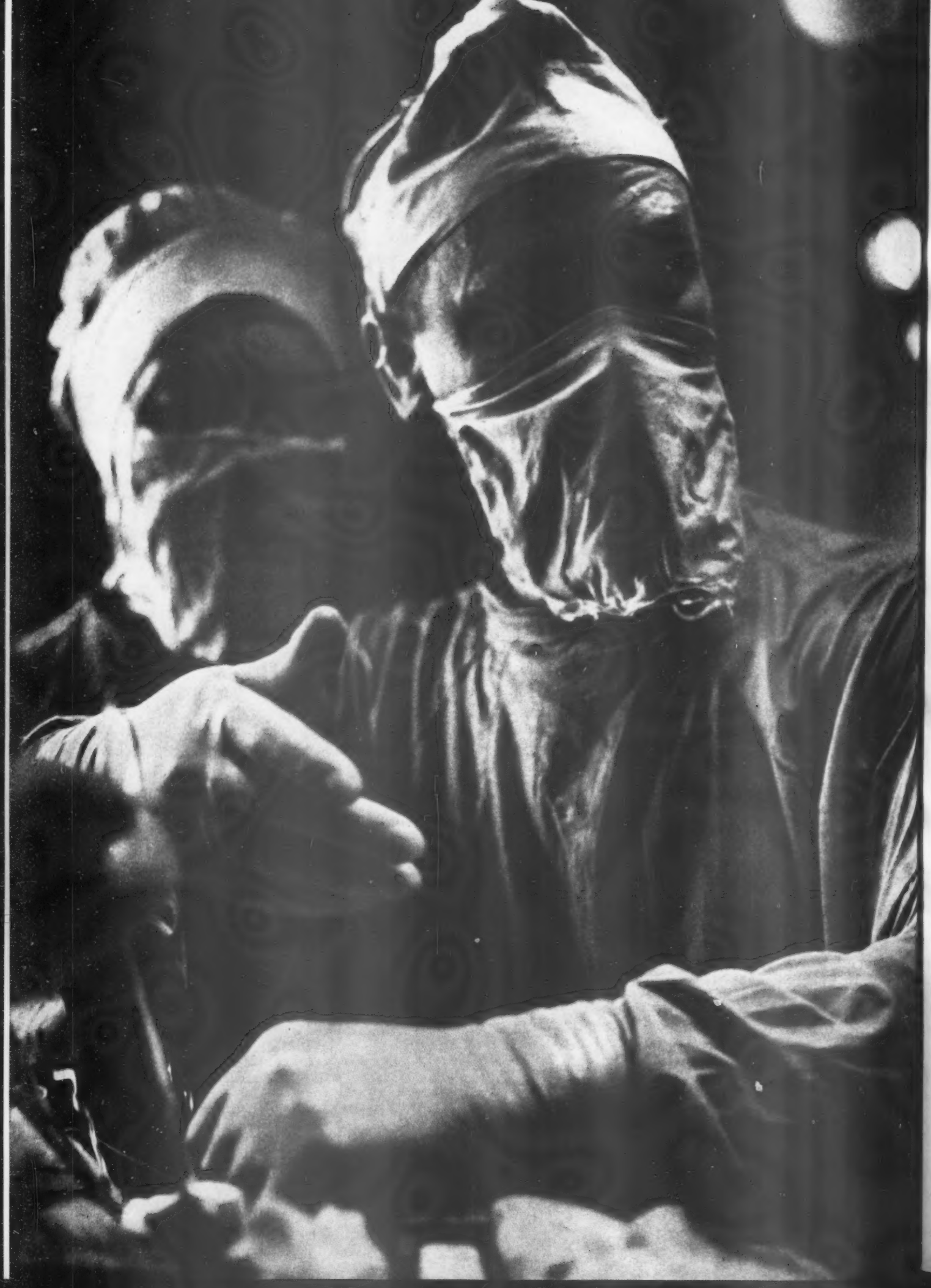
Fig. 4 Reproduced in *Un Grand Français Le Chimiste Thenard (1777-1857)* by Paul Thenard. Imprimerie Jobard, Dijon, 1950. Original in the Bibliothèque Nationale.

Fig. 5 *Journal de Pharmacie et de Chimie,* Paris, 1921, 7ser., *24.*

Fig. 6 *Cent Cinquantenaire des Facultés et Écoles de Pharmacie, 1803-1953.* Supplément au no. 5 mai 1954 (T. XII) des *Annales Pharmaceutiques Françaises.* Masson et Cie. Éditeurs, Paris.

Fig. 7 Brice and Bottet: *Le Corps de Santé Militaire en France,* Paris, 1907.

Page 110 Brice and Bottet: *Le Corps de Santé Militaire en France,* Paris, 1907.



ANTIBIOTICS TODAY

New Developments in Antibiotics were Reported at the First Conference on Anti-Microbial Agents held in Washington, D. C. in October

► NEW DEVELOPMENTS AND TRENDS in the field of antibiotics were reported at the first Conference on Anti-Microbial Agents held in Washington, D. C. October 26, 27, and 28, 1960. The Conference was sponsored by the Society for Industrial Microbiology headed by a Committee on the Conference on Anti-Microbial Agents. The Chairman of the Committee was L. G. Herman, Ph.D., Bethesda, Maryland. Dr. Selman A. Waksman, New Brunswick, New Jersey, served as Honorary Chairman.

The meeting, over a three day period, covered nearly ever area of interest in the field of anti-microbial agents. Sessions covered various categories including clinical studies, new products, laboratory studies, anti-fungal agents, modes of action, anti-tumor agents, and agricultural and nonmedical uses. Also, panel discussions covering "Problems Concerned with Clinical Laboratory Testing and Use of Anti-Microbial Agents," and "Modes of Action of Antibiotics," were of special interest. Participants included outstanding researchers and clinicians from throughout the country.

Complete abstracts for papers presented at the Conference were made available through the Society for Industrial Microbiology. A selected number of these abstracts which have a special interest to practicing hospital pharmacists are printed here with permission. A book covering the transactions of the Conference on Anti-Microbial Agents is being published and will be available within the next few months from Plenum Press, Consultants' Bureau, Enterprise, Inc., 227 W. 17th St., New York 11, N. Y. This will include a complete report on the panel discussions as well as papers presented.

Clinical Studies

Phenoxyethyl Penicillin

The Treatment Of Acute Gonococcal Urethritis With Potassium a-Phenoxyethyl Penicillin

ELMER H. LOUGHLIN *and* LOUVERTURE ALCINDOR, *New York Medical College, Flower and Fifth Avenue Hospitals, New York, N.Y.; Faculty of Medicine, Port-au-Prince, Haiti.*

Using initial doses of 1 Gm. of potassium a-phenoxyethyl penicillin (Maxipen) TM followed in 12 hours by 0.5 Gm., for a total dose of 1.5 Gm., we have treated 100 patients with acute gonococcal urethritis. Using standard criteria, with clinical and bacteriological re-examinations on the 2nd or 3rd day, on the 7th or 8th day, and again at 2 weeks post-treatment, 96 patients were found to have reacted in a satisfactory manner and were considered to have been cured. The other 4 patients, although they were clinically and bacteriologically negative at the time of the first two post-treatment examinations, again presented clinical and bacteriological evidence of gonococcal urethritis at 2 weeks post-treatment. In none of these patients could the possibility of reinfection be excluded. There were no notable adverse reactions to these dosages of potassium a-phenoxyethyl penicillin. There were no allergic or anaphylactic reactions in these cases.

Potassium Phenethicillin

Oral Penicillin (Potassium Phenethicillin) In The Treatment Of Gonorrhea

FRANK R. GOMILA *and* JOHN E. LINDER, *City of New Orleans Health Department, New Orleans, Louisiana.*

One hundred patients (divided in number about equally between the sexes) from various age and racial groups were treated for gonorrhea. All were seen in an Outpatient Clinic for Venereal Disease Control in a large metropolitan center. Smear and cultures before and after treatment were obtained from all female patients. Smears were taken before and after treatment from all male patients. Cultures were obtained from some males before and after treatment. Patients were followed for 4 weeks after infection was controlled to determine whether relapse had occurred. Treatment consisted of oral penicillin (potassium phenethicillin). Various dosages were tried. The most effective dosage schedule was 250 mg. b.i.d. for 6 days. Many patients were effectively controlled by the end of 12 hours. From results obtained, it becomes clear that this new oral penicillin assures therapeutic responses formerly obtainable only with injectible penicillins. This seems attributable to the high blood levels promptly attainable with the new product. Potassium phenethicillin promises to be a most useful drug for those—e.g., all physicians—concerned with the control of venereal disease.

Synnematin B

The Synnematin B Susceptibility Of Penicillin G Resistant Gonococci

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Using the agar-streak method for determining antibiotic susceptibility, it was found that relatively resistant penicillin G gonococcal strains required higher concentrations of synnematin B than did those strains which were highly sensitive to penicillin G.

The relationship of synnematin blood concentrations to strain susceptibility will be discussed.

Maxipen

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There was remarkable freedom from side effects. Patients appeared able to tolerate 1.0 or 1.5 Gm. of antibiotic dissolved in 2.0 of sterile water injected every 4 or 6 hours in the same area for prolonged periods of time with only minimal induration around the injection site and very little discomfort. One patient developed a serum sickness type allergic reaction after 20 days of therapy, and another noted peeling of the skin on both hands following 2 weeks of medication. No other significant side effects were noted. Dimethoxyphenyl penicillin shows promise of being a safe

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Pre-Operative Bowel "Sterilization"—A Double-Blind Study Comparing Kanamycin, Neomycin And Placebo

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Antibacterial effectiveness, including rapidity of action, and incidence and type of superinfections and other post-operative infections. The aerobic fecal flora was analyzed serially with quantitative techniques in all patients. Four of the five treatment groups showed a rapid and profound reduction in flora, with little difference between the groups. Coagulase-positive staphylococci were isolated in many cases—either during the treatment period or post-operatively or at both times. The fifth group showed no particular change in fecal flora. A number of postoperative wound infections occurred and many other complications were noted; pneumonia, abscesses in various locations, genito-urinary tract infections, peritonitis, enterocolitis, septicemia, and wound dehiscence. Data will be presented regarding the comparative incidence of these complications in the various study groups and regarding the organisms responsible for the infections, together with a correlation with stool cultures.

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Oral Penicillin (Potassium Phenethicillin) In The Treatment Of Gonorrhea

FRANK R. GOMILA *and* JOHN E. LINDER, *City of New Orleans Health Department, New Orleans, Louisiana.*

One hundred patients (divided in number about equally between the sexes) from various age and racial groups were treated for gonorrhea. All were seen in an Outpatient Clinic for Venereal Disease Control in a large metropolitan center. Smear and cultures before and after treatment were obtained from all female patients. Smears were taken before and after treatment from all male patients. Cultures were obtained from some males before and after treatment. Patients were followed for 4 weeks after infection was controlled to determine whether relapse had occurred. Treatment consisted of oral penicillin (potassium phenethicillin). Various dosages were tried. The most effective dosage schedule was 250 mg. b.i.d. for 6 days. Many patients were effectively controlled by the end of 12 hours. From results obtained, it becomes clear that this new oral penicillin assures therapeutic responses formerly obtainable only with injectible penicillins. This seems attributable to the high blood levels promptly attainable with the new product. Potassium phenethicillin promises to be a most useful drug for those—e.g., all physicians—concerned with the control of venereal disease.

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Antibiotics on Gastrointestinal Tract

A Controlled Blind Study Of The Effects Of Antibiotics On The Gastrointestinal Tract

G. R. HARTMAN, J. H. EPSTEIN, W. G. MC CARTEN, M. GAFFNEY *and* M. J. ROMANSKY, *The George Washington University School of Medicine, Washington, D.C.*

A controlled blind study on fifty-six medical students was performed to observe the effects of broad spectrum antibiotics on the gastrointestinal tract. The agents studied were erythromycin (Ilotycin), erythromycin (Ilosone), tetracycline, tetracycline plus stress formula, and a placebo, which were administered in doses of two capsules four times a day for a period of seven days, in a double blind technique. Observations were made in the following areas: Clinical response manifested by the subjects themselves, correlated with observations of the lower colonic segment, cytological changes in direct smears from the bowel wall, and microbiological evaluation of the stools and proctological specimens, before, during and after treatment. Included in the microbiological studies were stool smears, cultures, identification of the fecal flora and sensitivity determinations. In addition, the material was subjected to mycological and parasitological studies.

There appears to be a correlation between clinical responses, change in the flora, and cytological appearance of stools and material from the bowel wall.

Colistin

Clinical Appraisal Of Colistin

C. EVANS ROBERTS JR., HENRY A. KUHARIC *and* WILLIAM M. M. KIRBY, *University of Washington School of Medicine, Seattle, Washington.*

Sodium colistinmethanesulfonate is a polypeptide antibiotic similar to polymyxin structure and antibacterial spectrum. Originally developed in Japan, it was more recently introduced in this country where studies over the past two years have shown it to be relatively non-toxic and active against a number of gram negative bacterial pathogens. The present report gives results of treatment with colistinmethanesulfonate in 20 adults and children with severe pseudomonas infections. Clinical diagnoses included acute bacterial endocarditis, bacteremia, meningitis, pneumonitis and chronic pyelonephritis. Therapy consisted of intramuscular injections given 2, 3, or 4 times daily, with a total dosage of 2 to 6 mg./Kg./day. Toxicity, consisting mainly of paraesthesias, occurred in 3 of 6 cases receiving a dosage of 4.5 mg./Kg./day or more. All side effects subsided promptly when therapy was discontinued. Pain at injection sites did not appear to be a problem. In some cases control of the pseudomonas infections by colistinmethanesulfonate was accompanied by the emergence of proteus species or gram positive cocci. Most of these 20 cases represented acute and chronic illnesses unresponsive to other antibiotics. Colistinmethanesulfonate therapy resulted in complete eradication of the pseudomonas infection in 11. An additional 4 patients showed definite improvement, while in 2 cases the results were indeterminate. In only 3 of the 20 cases did pseudomonas infections fail to respond despite adequate therapy. It is concluded that colistinmethanesulfonate is a relatively safe and effective antibiotic in the therapy of pseudomonas infections.

Friedlander's Pneumonia

Clinical Findings And Results Of A Therapeutic Regimen In Acute Friedlander's Pneumonia

RAY A. OLSSON *and* MONROE J. ROMANSKY, *The George Washington University School of Medicine, Washington, D.C.*

The majority of 13 patients with acute Friedlander's pneumonia reported 4 years ago were treated with either penicillin or penicillin and streptomycin. The 70 percent mortality in this group led to the decision to treat all suspected cases on the basis of the admission sputum smear with streptomycin in combination with either chloramphenicol or one of the tetracyclines. Nine patients have subsequently been treated using this regimen with but 4 deaths.

The clinical findings in the present group of patients are typical of this condition: 8 patients were men, all of whom were alcoholics. Four patients had purulent sputum; only 2 had bloody sputum. The right upper lobe was most frequently involved (4 patients). Three patients had involvement of more than 1 lobe. Six patients had leukocyte counts of 10,000 cu. mm., or less, it was under 4,000 in 2 patients. Two of the 4 deaths occurred within 12 hours of admission, making evaluation of therapy impossible. The remaining 2 deaths resulted from asphyxia following sudden discharge of pus from a cavity.

The results in this group of patients illustrate the effectiveness of the antibiotic therapy. Of equal importance are adjunctive measures such as bronchoscopy, nebulization therapy, and, in selected cases, steroids.

Vancomycin

Clinical Use Of Vancomycin

H. G. DANGERFIELD, W. L. HEWITT, S. M. FINEGOLD, Z. KUDINOFF *and* B. T. BLACKMAN, *Wadsworth Veterans Hospital, and the University of California Medical Center, Los Angeles, California.*

Clinical experience with vancomycin has consisted of treatment of staphylococcal infections in approximately 100 patients.

Antibiotic sensitivities of cultures obtained from one fourth of the patients were done by the tube dilution technique. Use of vancomycin has been limited to severe staphylococcal infections which were resistant to penicillin or had failed to respond to previous antibiotic therapy. One fourth of the total case material has been abstracted. Forty percent of the patients were treated for staphylococcal septicemia or endocarditis, 25 percent for staphylococcal pneumonia, 25 percent for osteomyelitis and severe wound infections, and 10 percent for staphylococcal enterocolitis. One case of anaerobic streptococcal endocarditis was treated.

Administration of the drug was intravenous but the patients with enterocolitis received the drug orally as well. Intravenous dosage ranged from 1-3 Gm. daily. Oral dosage ranged from 3-8 Gm. daily. The mortality rate was approximately 60 percent. However, mortality due to overwhelming staphylococcal infections was less than 10 percent. Toxicity has consisted primarily of thrombophlebitis in those patients receiving prolonged intravenous administration of the drug. Two cases of transient leukopenia were observed which responded to cessation of therapy. We have no evidence of direct relation of ototoxicity or nephrotoxicity to vancomycin therapy.

Pneumococcal Meningitis

Pneumococcal Meningitis In The Adult; Clinical, Prognostic And Therapeutic Findings In 43 Patients

RAY A. OLSSON, JAMES C. KIRBY *and* MONROE J. ROMANSKY, *The George Washington University School of Medicine, Washington, D.C.*

During the 10-year period ending in July 1960, 43 patients with pneumococcal meningitis were encountered on this service. The majority were over 50 years of age. Meningitis was secondary to pneumonia in 16 patients and to otitis in eight. The spinal fluid smear was very reliable for early diagnosis, revealing the etiologic organism in 33 to 34 instances.

Factors having a bearing on prognosis were evaluated: the presence of associated pneumococcal infections, illness of over 3 days duration and coma were associated with a mortality of 75 percent or greater. Bacteremia, old age, blood count, spinal fluid cell count or sugar concentration did not correlate with mortality. Therapy in 36 patients was broadly classifiable into penicillin alone (23 patients), erythromycin (6 patients) and penicillin and one of the tetracycline group (7 patients). The mortality in the penicillin-treated group was

56 percent, that of the erythromycin group 50 percent, and 85.9 percent in the group treated with penicillin and a tetracycline.

Hemophilus Influenza Type B Meningitis

Management Of Hemophilus Influenza Type B Meningitis

PETER V. BOVE *and* RICHARD KOCH, *University of Southern California School of Medicine and the Children's Hospital at Los Angeles, California.*

Two hundred and thirty five children with Hemophilus influenza have been treated over a 10 year period at the Children's Hospital, Los Angeles, California, with varied combinations of streptomycin and sulfadiazine plus either oxytetracycline, tetracycline or chloramphenicol. The mortality rate for the overall group was 8 percent, the residual rate was 7.2 percent, and the subdural effusion rate was 13.6 percent. In this group there does not appear to be a significant difference in the mortality or residual rates among the children in the 3 antibiotic groups, although the lowest mortality and morbidity was in the oxytetracycline group. Death due to H. influenzae meningitis could rarely be attributed to drug failure. Eleven of the 19 fatal cases were moribund on admission and appeared to be beyond therapeutic help. Careful attention must be paid to proper supportive measures. The overzealous use of intravenous fluids must also be guarded against. The importance of adequate nursing care is stressed and a suggested regime of treatment is offered.

Spiramycin and Daraprim

Comparative Action Of Spiramycin And Daraprim In The Treatment Of Human Ocular Toxoplasmosis

JOEL B. CHODOS *and* HEDWIGE E. HABEGGER-CHODOS, *Wills Eye Hospital and Graduate School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania*

Seventy seven patients with acute retino-choroidal lesions of toxoplasmic origin were treated with spiramycin, whereas 20 patients were given the classical treatment of Daraprim (pyrimethamine) combined with sulfonamides. Excellent results were obtained in both groups. However, no direct comparison can be made in the 2 series, as the patients receiving spiramycin were almost all in the acute phase of a primary or satellite choroidal lesion, whereas those given Daraprim and sulfonamides were in the stage of reactivating an old focus. It is imperative to achieve high blood and tissue levels, rapidly and consistently, to treat acute cases. This is easily accomplished with spiramycin, whereas with Daraprim the blood levels are extremely variable. Nausea and vomiting occur almost invariably with the recommended loading dose of 100 to 150 mg. of Daraprim rendering the achievement of adequate blood levels even more difficult. Thrombocytopenia and granulocytopenia are frequent complications with Daraprim whereas in all of our patients given spiramycin no side effects were observed. Spiramycin is recommended in the acute phase of human ocular toxoplasmosis as the most effective and safest therapy presently available.

Modes of Action

6-Aminopenicillanic Acid, Benzylpenicillin, 2, Dimethoxypenicillin, a-Phenoxyethylpenicillin, and Phenoxymethylpenicillin

A Comparison Of The Biochemical Activities Of 6-Aminopenicillanic Acid, Benzylpenicillin, 2, Dimethoxypenicillin, a-Phenoxyethylpenicillin And Phenoxymethylpenicillin

HARRY G. STEINMAN, *Laboratory of Clinical Investigation, National Institutes of Health, Bethesda, Maryland.*

A number of penicillins, including 6-aminopenicillanic acid, benzylpenicillin, and phenoxymethylpenicillin, were compared with respect to some of their biochemical and biological activities. Phenoxymethylpenicillin and 2 stereoisomers of 2-phenoxymethylpenicillin resembled benzylpenicillin in their reactivities with cell-free preparations of penicillinase obtained from *Bacillus cereus* and from *Staphylococcus aureus*. In contrast, 6-aminopenicillanic acid was hydrolyzed at a lesser rate and 2, 6-dimethoxypenicillin at a very low rate.

Minimal bacteriostatic concentrations of the penicillins were determined by their effects on rate of growth. Against penicillinase-producing *S. aureus* there appeared to be a direct correlation between resistance to the destructive action of penicillinase and effectiveness as a bacteriostatic agent.

The several penicillins were compared as penicillinase inducers in *B. cereus* and in *S. aureus*. Superimposed upon intrinsic specificities, there appeared to be a correlation between resistance to the destructive action of the enzyme and effectiveness as an inducer of penicillinase.

D-Phenoxyethylpenicillin

Synergism Between The Diastereoisomers Of D-Phenoxyethylpenicillin On Sensitive And Resistant Staphylococci

ALFRED KRAUSHAAR *and* EKKEHARD E. SCHMID, *Medical Research Division, Biochemie Ges.m.b.H., Kundl/Tyrol, Austria.*

d-Phenoxyethylpenicillin and its diastereoisomeric fractions were investigated for their microbiological properties using strains of staphylococci of varying sensitivity and resistance to penicillin. Particularly the examination of the D- and L-diastereoisomers of this penicillin and their interaction in mixtures was carried out. The investigations were performed by dilution techniques, combination diagrams and manometric (Warburg) measurements. It was found that the L-isomer is more effective on penicillin sensitive strains of staphylococci, than the D-isomer, these differences, however, start to flatten out when strains of lesser sensitivity are used. On the threshold of resistance and with increasingly resistant strains there is a clear cut reversal of activity, the D-isomer was found to be more effective. It was proved beyond doubt that a true synergism exists between the diastereoisometric fractions, not only for longer lasting, up to 24 hours *in vitro* experiments but also for short time manometric measurements, which correspond to the serums levels of therapeutically administered oral penicillin. Lastly, mention is also made of differences concerning the inactivation of the respective diastereoisomers by staphylococcal penicillinase.

Antibiotics and Antimetabolites

Ultraviolet Microscopy Of Psittacosis Virus-Infected Cells Treated With Antibiotics And With Antimetabolites

MORRIS POLLARD, RICHARD W. MOORE, THEODORE J STARR *and* YOH TANAMI, *The University of Texas—Medical Branch, Galveston, Texas.*

The replication of psittacosis virus in tissue cells growing on cover slips involves a definite chemical sequence which has been observed with acridine orange stain and ultraviolet microscopy. Within 14 hours after inoculation, the DNA virus particle is in the cytoplasm and is embedded in an RNA (red) matrix. The red mass enlarges and multiplies, and during the next 48 hours each then proceeds to maturation through a color sequence of orange and yellow to pin point green DNA virus. The directed chemical reaction which the psittacosis virus "sparks off" has been modified through addition of antibiotics and of fluorine-substituted pyrimidines to the nutrient medium in which the cells are growing. Graded doses of antibiotics were added to cells containing the virus at the 14 hour "red-ball" stage. Chlortetracycline hydrochloride (50 to 3 mcg. per ml. nutrient fluid) arrested the viral biosynthetic process at the stage at which it had been added. Infective virus was not recovered from cell cultures in which virus maturation had been arrested. Oxytetracycline and tetracycline stopped the ma-

turation of virus only at the higher dosage levels. Chloramphenicol, kanamycin, erthromycin, penicillin, and streptomycin showed a declining effect, even at dosages which approached cytotoxic levels. The addition of 5-fluoro uracil and of 5 fluoro orotic acid to virus-infected cells (14 hour "red-ball" stage) resulted in the formation of masses of abnormal red ("fraudulent") RNA in the cytoplasm. Virus was not recovered from infected cells which had been exposed to the antimetabolite. The two antimetabolites did not induce the accumulation of visible amounts of abnormal RNA as virus-free cells. As reflected by reaction of psittacosis virus to the effects of antibiotic and of antimetabolite agents, the former blocks DNA and the RNA-matrix which it induces, and the latter blocks maturation of virus through formation of "fraudulent" nucleic acid.

Azaserine

Microbiological Studies On The Nature Of Action Of Azaserine

ROBERT F. PITTILLO, *Southern Research Institute, Birmingham, Alabama.*

Published reports on the effects of metabolites on the inhibition of microorganisms by azaserine indicate that phenylalanine, tyrosine, tryptophan, and various purine bases block the inhibition caused by this antibiotic. Due to the variety of test systems used by various investigators, replication and interpretation of experimental findings have heretofore been difficult. The effect of metabolites on the inhibition of *Escherichia coli, Streptococcus faecalis,* and *Saccharomyces cerevisiae* has been studied using the spreadplate technique. Various purines and purine derivatives consistently reverse inhibition caused by threshold concentrations of azaserine in all 3 organisms. Marked reversal of inhibition is obtained with glutamine, phenylalanine, tyrosine, and tryptophan. A variety of other amino acids and organic acids show varying degrees of lesser azaserine antagonizing activity. Histidine enhances the reversing activity of phenylalanine and tyrosine but not that of glutamine. Data will be presented that indicate azaserine inhibition of amino acid utilization rather than amino acid biosynthesis. A proposal will given by which the results of this investigation may be interpreted.

Kanamycin and Neomycin

Bioassay And Spectrophotometric Studies On The Interaction Of Kanamycin And Neomycin With Nucleic Acids

ROBERT L. DAVIS, SYLVIA B. MAC INTYRE *and* ALFRED H. LAWTON, *General Research Service, Veterans Administration Center, Bay Pines, Florida.*

Earlier (*Antibiotics Annual* 60:330-336 (1959), we reported that neomycin and kanamycin have the capacity either to desorb or prevent the initial uptake of large quantities of vitamin B_{12} (tagged with Cobalt 60 for easy identification) previously adsorbed to or in contact with the resting cells of certain lactobacilli. In view of the significance of the nucleic acid content of the bacterial cell and cell surface, experiments were undertaken to investigate any interaction of neomycin and kanamycin with highly polymerized preparations of deoxy- and ribonucleic acids. Bioassays utilizing *L. leichmannii* as test organism indicated that there were marked interactions between the nucleic acids and antibiotics. When increasing quantities of kanamycin or neomycin were incorporated with an amount of ribonucleic acid previously demonstrated to inhibit almost completely the uptake of Cobalt 60 vitamin B_{12} by *L. leichmannii,* increasing amounts of radio-vitamin became available for microbial adsorption. Deoxyribonucleic acid interacted with the antibiotics in a similar qualitative but not quantitative manner. Parallel spectrophotometric studies were also performed to determine the nature of the interaction. The results and their significance will be reviewed.

Oxytetracycline

Antibiotic Inhibitors IV. The Effect Of Multivalent Metallic Cations On Intestinal Absorption And In Vitro Antibacterial Activity Of Oxytetracycline

Z. ZOLLI, JR., *and* K. E. PRICE, *Chas. Pfizer & Company Inc., Terre Haute, Indiana.*

The *in vitro* inhibition of antibacterial action of oxytetracycline by certain divalent and trivalent cations was confirmed. The trivalent ion, Fe^{+++} and Al^{+++}, were 100 to 1000 times more inhibitory than divalent as assessed by concentrations necessary to reduce by 50 percent activity *in vitro* against 4 species of organisms. The *in vitro* inhibitory activities of these ions were closely paralleled by their ability to retard absorption of oxytetracycline through the wall of the litigated duodenal loop of the chicken. The other divalent ions, Ca^{++}, Mg^{++} and Mn^{++}, were similar in activity as all three reduced serum and urine concentrations of OTC by 50 percent when the ions were present in the loop in concentrations of 0.04 molar. The trivalent ions were 10 times or more as effective as the divalent ones in retarding intestinal absorption.

New Products

Penicillin

Enzymatic Cleavage And Resynthesis Of Penicillin

WILFRIED KAUFMAN, KLAUS BAUER *and* HANS-ALBERT OFFE, *Pharmaceutical Research Laboratory, Farbenfabriken Bayer AG., Wuppertal-Elberfeld, Germany*

Early in 1959 we succeeded hydrolyzing enzymatically penicillin G to 6-aminopenicillanic acid (I) and phenylacetic acid (II) by cells of *Escherichia coli* and other bacteria. This reaction proceeds in neutral to slightly alkaline media and has proved to be reversible at acid *p*H-vaues. The slow reaction rate leading to a synthesis is considerably increased by application of phenylacetyl-glycin, a derivative of (II) being relatively energy-rich: (II) is transferred thereby from glycine to (I). Other acylamino acids may be employed for this reaction with analogous results. The synthesis of penicillins by reaction of (I) and acylamino acids derived from disubstituted acetic acids is, however, extremely slqw. Thus the yield of a-phenyloxyethylpenicillin (III) resulting from the enzymatic reaction between a-methylphenoxyacetyl-glycin and (I) is very low. In contrast thereto, we obtained high yields of (III) by the action of *E. coli* on a mixture of a-methylphenoxy-acetyl-thioglycollic acid (IV) and (I), thioglycollic acid being split off in this reaction. Since the reaction proceeds as well in slightly alkaline as in acid media, it is thought to be irreversible. Hence, the bacterial enzyme is able to effect a nearly quantitative conversion of benzylpenicillin to (III) in the presence of (IV).—The following energy-rich compounds may be used for the transfer of acyl-residues to (I): acylated hydroxy-carboxylic acids, mercapto-carboxylic acids, phenols and thiophenols.

2, 6-Dimethoxyphenyl Penicillin

Microbiological Properties Of A New Synthetic Penicillin, 2, 6-Dimethoxyphenyl Penicillin

A. GOUREVITCH, J. A. LUTTINGER *and* J. LEIN, *Research Division, Bristol Laboratories, Syracuse, N. Y.*

A new synthetic penicillin, 2, 6-dimethoxyphenyl penicillin (Staphcillin TM), inhibits *Staphylococcus aureus* resistant to high levels of penicillin G at the same concentration as it inhibits sensitive strains. Analysis of the mechanism involved indicates that the penicillin is uniquely resistant to destruction by staphylococcal penicillinase. In experiments relating to its mode of action, it was found that, on exposure to 2, 6-dimethoxyphenyl penicillin, cells of *Escherichia coli* became swollen and osmotically fragile. However, spheroplasts were not observed.

Ristocetins A and B

The Greatly Increased Activity Of Ristocetins A and B Following Acid Hydrolysis

J. E. PHILIP, J. R. SCHENCK, M. P. HARGIE, J. C. HOLPER *and* W. E. GRUNDY, *Abbott Laboratories, North Chicago, Illinois.*

Mild acid hydrolyses of ristocetins A and B increase the activity 4 to 30 fold against the sensitive gram positive organisms when measured by the broth dilution technique. The *B. subtilis* plate diffusion assays decrease however. Four sugars and an amino fragment are gradually liberated from the molecule under these mild conditions. These more active degradation products do not retain cross resistance properties with the parent ristocetins A and B against a *Staphylococcus aureus* strain which was made resistant to ristocetin A. This increase in activity can be demonstrated *in vivo* in mice infected with *Diplococcus pneumoniae* 6031, *Staphylococcus aureaus* 67 and *Streptococcus pyogenes* C203.

Isolation studies indicate that mixtures of active degradation products, varying in carbohydrate content, are produced during the hydrolysis. Ristocetins A and B contain 40 and 30 percent by weight of sugars respectively. Ristocetin A has 4 moles of mannose and 2 moles each of glucose, D-arabinose and rhamnose. Ristocetin B has 1 mole of D-arabinose and 2 moles each of mannose, glucose and rhamnose.

Porfiromycin

Porfiromycin, A New Antibiotic: I. Discovery And Biological Activities

C. DEBOER, A. DIETZ, N. E. LUMMIS *and* G. M. SAVAGE, *Research Laboratories, The Upjohn Company, Kalamazoo, Michigan.*

A new antibiotic, porfiromycin, has been isolated in these laboratories from a species of soil actinomycete, *Streptomyces ardus,* nov sp. The description of the morphology and physiology of *S. ardus,* and the submerged media and fermentation conditions for the production of porfiromycin are described. On the basis of papergram bioautographs the culture filtrates of *S. ardus* contain a new component, porfiromycin, which differs from any of the antibiotics available to us for comparison. Porfiromycin is active against a variety of both gram-negative and gram-positive bacteria and mammalian cells. It is marginally active against protozoa and slightly active against fungi.

Porfiromycin, A New Antibiotic: II. Isolation And Characterization

R. R. HERR, M. E. BERGY, T. E. EBLE *and* H. K. JAHNKE, *The Upjohn Company, Kalamazoo, Michigan.*

This paper describes the isolation and characterization of a new broad spectrum antibiotic, porfiromycin. The antibiotic is isolated by solvent extraction and partition chromatography as a dark purple crystalline material. Results of analyses indicate an empirical formula $C_{19}H_{20}N_4O_8$ and molecular weight 348.

Porfiromycin, A New Antibiotic: III. In Vitro And In Vivo Evaluation

C. LEWIS, H. W. CLAPP, L. E. RHULAND *and* H. R. REAMES, *The Upjohn Company, Kalamazoo, Michigan.*

The *in vitro* and *in vivo* antimicrobial activity of a new antibiotic has been described. *In vitro,* it was active against numerous pathogenic organisms, including streptococci, staphylococci, diplococci, enterococci, coliforms *Pasteurellae, Salmonella, Clostridia, Proteus* and *Pseudomonas* species. *In vivo,* porfiromycin compares favorably with other commonly used antibiotics in protecting mice infected with *S. aureus, S. hemolyticus, S. viridans, D. pneumoniae, P. multocida, S. typhimurium* and *K. pneumoniae.* It protected chicks against lethal challenges of *S. gallinarium* when administered subcutaneously and eradicated *Leptospira* from kidneys of gerbils which were shedding the organism in the urine.

Neither human nor rabbit serum nor pooled human urine interfered with the *in vitro* activity of the antibiotic. There was no evidence of cross-resistance between porfiromycin and other antibiotics when tested against resistant strains of *S. aureus* from clinical sources or of strains made resistant in the laboratory.

Induced resistance to porfiromycin was slow and developed in a stepwise manner.

Porfiromycin, A New Antibiotic: IV. Microbiological Assays

L. J. HANKA, *Research Laboratories, The Upjohn Company, Kalamazoo, Michigan.*

Several types of microbiological assay for porfiromycin were developed. A disc-plate assay with *Staphylococcus aureus* FDA-209P on brain-heart infusion agar has a sensitivity of 0.75 mcg./ml. It has very sharp zones and is used for assay of fermentation beers and pure samples of the drug. The disc-plate assay with *S. aureus* UC-607 on nutrient agar has a sensitivity of 0.02 mcg./ml. but the zones are generally somewhat hazy. A turbidimetric assay using *S. aureus* UC-607 can detect a concentration of 0.001 mcg./ml. of the drug in the medium.

Paecilomyces Persicinus

Antibiotic Production By Paecilomyces Persicinus

MICHAEL A. PISANO, ALAN I. FLEISCHMAN, M. L. LITTMAN, JAMES D. DUTCHER *and* FELIX E. PANSY, *Department of Biology, St. John's University, Jamaica, New York, and the Squibb Institute for Medical Research, Brunswick, N.J.*

A filamentous fungus of soil origin was found to produce an antibiotic which is active against gram positive and gram negative bacteria. The antibiotic was produced in a medium containing cottonseed meal, corn steep liquor, glucose and calcium carbonate. Highest yields of antibiotic, approximately 100 mcg. occurred after 96 hours incubation at 28.5 C. in shake flasks and fermenters of various sizes. The antibiotic was isolated by absorption onto charcoal at *p*H 8 followed by elution with methanol. Isolation could also be accomplished through the use of a charcoal column followed by elution with acetone. Solids obtained by these procedures assayed about 10 mcg. These solids could be further purified by fractional precipitation from methanol with diethyl ether, chromatography on a cellulose column, or by chromatography over granular carbon. Solids of about 30 mcg. were obtained. The latter were capable of protecting white Swiss mice infected with *Diplococcus pneumoniae,* Type III. Further studies employing paper chromatography, ionophoresis, and various chemical procedures indicated the antibiotic to be identical with synnematin B (cephalosporin N). The fungus has been ultimately identified as *Paecilomyces persicinus.* To our knowledge, this report is the first demonstration of antibiotic production by this species.

Production Of Synnematin B By Paecilomyces Persicinus In A Chemically Defined Medium

ALAN I. FLEISCHMAN *and* MICHAEL A. PISANO, *Department of Biology, St. John's University, Jamacia, New York.*

The production of synnematin B (cephalosporin N) by *Paecilomyces persicinus* in a chemically defined medium, containing glucose, asparagine, betaine and inorganic salts, was studied. Experiments were conducted employing 250 ml. Erlenmeyer flasks which were incubated at 28.5 C. on a rotary shaker. Maximum synnematin B production, 10 mcg., occurred after 72 hours' incubation; whereas the highest mycelial yield, 9.8 Gm. liter, was obtained after 96 hours. The medium was adjusted to *p*H 7.0 before autoclaving and after autoclaving the *p*H fell to 6.1. After 12 hours, the *p*H dropped to 4.6 and then rose to approximately 7.0 where it

held for the remainder of the fermentation. Both the carbohydrate and the nitrogen content of the medium decreased as a function of mycelial growth. About 80 percent of the carbohydrate and 82.5 percent of the nitrogen of the medium was utilized during the fermentation. Inorganic sulfate, approximately 43 percent, was utilized during the period of synnematin B production, after which time the residual sulfate was essentially untouched. During the first 12 hours of the fermentation, approximately 43 percent of the inorganic phosphorus had been used by the fungus. Following this, phosphorus utilization progressively decreased, and ceased after 84 hour. At this time about 94 percent of medium inorganic phosphorus had been utilized.

5-Methyl-3-sulfanilamido-isoxazole

Experience With A New Sulfonamide In The Treatment Of Streptococcal Pharyngitis

BARBARA BRADEN, JOHN P. COLMORE *and* MARTIN M. CUMMINGS, *University of Oklahoma Medical Center, Oklahoma City, Oklahoma.*

In a large hospital health service, 72 consecutive patients with bacteriologically proven beta-hemolytic streptococcal pharyngitis have been treated with a new sulfonamide, 5-methyl-3-sulfanilamido-isoxazole (Hoffmann-La Roche Ro4-2130). All patients received the same dosage schedule (2 Gm. daily). In 66 patients pre- and post-therapy bacteriologic studies were available for review. In 65 of these, the post-therapy cultures were negative for beta-hemolytic streptococci. Only one was considered to be a treatment failure. In 3 of the 65 successfully treated patients it was necessary to extend the usual treatment period to achieve bacteriologic conversion. Patient acceptance of the drug was good, with only 3 of the 72 patients noting any side-reactions (2 with questionable dermatitides and one who developed nausea and vomiting after inadvertent ingestion of 2.5 times the prescribed dosage). In those patients in whom urine and peripheral blood studies were performed, no significant abnormalities attributable to the drug were noted. The bacterial conversion rate in beta-hemolytic streptococcal pharyngitis using 5-methyl-3-sulfanilamido-isoxazole compares favorably with other therapeutic regimens.

The Long Term Treatment Of Chronic Pyelonephritis With A New Sulfonamide

ANTHONY W. CZERWINSKI, JOHN P. COLMORE, MARTIN M. CUMMINGS *and* BERNARD BROWN, *University of Oklahoma School of Medicine, Oklahoma City, Oklahoma.*

Thirty three patients with pyelonephritis were treated with 5-methyl-2-sulfanilamide-isoxazole (Hoffmann-La Roche Ro 4-2130) for 3 months and have been followed from 1 to 6 months. The organisms cultured at the start of treatment with 5-methyl-3-sulfanilamide-isoxazole were: *Escherichia coli* (15), non-hemolytic staphylococcus (9), *Aerobacter aerogenes* (4), *Proteus mirabilis* (4), and *Pseudomonas aeruginosa* (3) These patients had had 2 or more acute exacerbations of pyelonephritis, compatible laboratory data, and on colony count 29 had more than 10^5 colonies per ml. of urine. The results of the therapy are: 2 had bacteriologic cure (3 successive sterile urine cultures), 5 had disappearance of the initially cultured organism, and 14 became asymtomatic. Twenty-nine disc sensitivity studies with 5-methyl-3-sulfanilamide-isoxazole showed; 5 cases had resistant organisms prior to therapy, and in 9 resistance developed while on therapy. The drug was clinically well accepted by 31 patients. Transient transaminase elevation occurred in 1 of 15 patients so tested, and 1 patient developed a dermatitis after 3 days of therapy. Ten patients received 3 months of treatment (2 with bacteriologic cure). Treatment was discontinued in 12—5 for lack of response; 3 were lost to follow-up, 2 because of toxicity; and 2 died.

Mikamycin

Clinical Effects Of Mikamycin Ointment On Infectious Skin Diseases

TOSHIAKI YASUDA, KAZUE OHARA, YASOU ASADA *and* YUJI OKUMURA, *The Kanto Teishin Hospital, Kansai Medical College, Kyoto University Medical School, Osaka University Medical School, Japan.*

The authors evaluated the effectiveness of a new antibiotic ointment, 0.5, 1.0 and 2.0 percent mikamycin in vaseline, on various kinds of infectious skin diseases. The following results were obtained in 187 cases: The mikamycin ointment was remarkably effective in 167 cases (89 percent) following topical use and ineffective in 20 cases. It was especially effective for superficial skin infections: impetigo, infectious eczematous dermatitis, eczema with secondary infection, infected wounds, sycosis vulgaris, folliculitis and others. Untoward side effects caused by the ointment were seen in only 4 cases.

There was no evidence of difference in effectiveness among the 2, 1 and 0.5 percent levels of the antibiotic in the ointment.

In agreement with these excellent clinical effects, coagulase positive staphylococci isolated from infectious skin lesions were very sensitive to mikamycin. About two thirds of them were resistant to penicillin. It was clearly demonstrated that there is no cross resistance between mikamycin and such antibiotics available at present as penicillin, streptomycin, chloramphenicol, and tetracycline. From the results mentioned above, it may be concluded that mikamycin ointment may be one of the new important weapons against superficial infectious skin diseases.

Clinical Trials Of A New Bacteriostatic Antibiotic, Mikamycin

YAEMON SHIRAHA, KATSUJI SAKAI, MICHIHIRO YAMANAKA, SHUNJI ISHIYAMA *and* SHOICHI SUMIDA, *Osaka City University Medical School, and The Kanto Teishin Hospital, Tokyo, Japan.*

Mikamycin is a new antibacterial antibiotic produced in a broth culture by *Streptomyces mitakaensis* isolated by Umezawa *et al.* There are two fractions of mikamycin: Mikamycin A is assumed to consist of mikamicinine and mikaic acid, and mikamycin B is a polypeptide, the chemical structure of mikamycins is under investigation. There are interesting evidences of remarkable synergistic bacteriostatic activity of these two mikamycin fractions. Both *in vitro* and *in vivo* tests of antimicrobial activity of mikamycins have revealed that almost all the gram positive pathogenic bacteria with the exception of some hemolytic streptococci are highly sensitive to this mikamycin mixture. Mikamycins show no cross resistance with penicillin and other known antibiotics.

Clinical trials of mikamycins in 116 patients suffering from various kinds of infections yielded an effective recovery rate of 88 percent. The sensitivity of coagulase positive staphylococci to mikamycins, and the administration routes and the dosage schedule of the agent, will be discussed. The toxicity of the new antibiotic is low, minor untoward side effects being found in only 15 percent of the cases.

Geminimycin

Geminimycin: A New Synergistic Antibiotic

K. V. RAO, D. W. RENN *and* I. TRUMMES, *The John L. Smith Memorial for Cancer Research, Chas. Pfizer & Co., Inc., Brooklyn 6, New York.*

The discovery of antibiotics designated as PA-114 A and B introduced an interesting phenomenon of synergism in antibiotics. In this case, however, the two components themselves have varying degrees of antibiotic activity of their own and a combination of the two produces a marked increase in activity. A unique case of synergism has now been found in which neither of the components has any measurable activity alone and only a combination of the two produces the activity. In

addition to this another unique feature of the combination is that one of the components is heat-labile, non-dialyzable, macromolecular type of compound and the other is a dialyzable crystalline compound of comparatively small molecular size. This antibiotic complex is termed geminimycin. For isolation of geminimycin B the broth first is concentrated, dialyzed and the dialyzate extracted with n-butanol. The concentrate is subjected to countercurrent distribution. The active fraction is recovered and crystallized from isopropyl ether. Geminimycin B is a colorless crystalline solid which melts at 65°. It is unstable at room temperature to both light and air. Geminimycin A exhibits solubility and stability pattern similar to those of proteinaceous substances. The individual components of geminimycin show no activity at levels of 1-2 mg./ml. but the combination shows activity at 1-2 mcg./ml. against many gram positive bacteria. The combination of the two is also much more toxic than the components.

Frenolicin

Isolation And Characteristics Of Frenolicin

J. C. VAN METER, MURRAY DANN *and* NESTOR BOHONOS, *Biochemical Research Section, Lederle Laboratories, Pearl River, N.Y.*

Frenolicin has been obtained in crystalline form from culture filtrates of a strain of *Streptomyces fradiae*. The antibiotic was extracted by ethyl acetate and after chromatography on activated magnesia-silica gel, it was crystallized readily from benzine. Elemental analyses and molecular weight measurements correspond to an empirical formula $C_{12}H_{14}O_5$. Physical chemical measurements and color tests indicate the presence of phenolic and carboxyl groups. This antibiotic has a relatively low order of activity *in vitro* against a variety of gram positive bacteria and fungi. Frenolicin was inactive in the following tests with mice: Staphylococcus and Streptococcus, *Diplococcus pneumoniae* (SVI), and *Klebsiella pneumoniae* (AD); PR8 #48 and SK viruses; Sarcoma 180, Lymphosarcoma 6C3HED and C3H Mammary Adenocarcinoma tumors; Nematospiroides, Oxurids and Hymenolepsis parasitic infections.

Stabilized Peroxide

A New Form Of Stabilized Peroxide As An Anti-Microbial Agent

HERBERT M. COBE *and* EMANUEL PLOUMIS, *School of Pharmacy, Temple University, Philadelphia, Pennsylvania.*

A recently developed, experimental ointment, T-3, appears to offer a new approach in combating infection and in cleansing contaminated lesions. T-3 is a combination of urea peroxide in an anhydrous glycerol base which has been modified to ointment-like viscosity. It is completely water soluble. The ointment under discussion does not form undesirable by-products such as are encountered with other forms of peroxides. The peroxide combination in T-3 has unusual stability which makes it possible to enhance the desirable characteristics of hydrogen peroxide; such as its cleansing action, freedom from toxicity and sensitizing properties. It exhibits antibacterial action against antibiotic resistant strains of micro-organisms. Comparative studies have been done with five commonly used antibacterial ointments. Special tests have been devised to demonstrate the detergent action of the ointment in the presence of organic matter such as blood and pus.

Because of its two outstanding properties—its anti-microbial action and unique cleansing action—the medicament appears to have value in the management of contaminated lesions. The anti-microbial action demonstrated against antibiotic resistant strains of micro-organisms is interesting and deserves further investigation.

Synthetic Lower Alkyl and Haloalkyl Penicillins

Antibiotic Properties Of Synthetic Lower Alkyl And Haloalkyl Penicillins

T. A. SETO, H. T. HUANG, J. M. WEAVER, T. J. MC BRIDE, A. R. ENGLISH *and* G. M. SHULL, *Pfizer Therapeutic Institute, Maywood, New Jersey.*

The availability of 6-aminopenicillanic acid (6-APA) has opened a route to synthesize and examine the antibiotic properties of a variety of new penicillins. In the present study a series of lower alkyl and haloalkyl penicillins were prepared to investigate the effect of structural variations on the antibiotic properties against gram positive and gram negative micro-organisms. They are tested for *in vitro* and animal protection activity. Dog and human blood serum levels were determined in a few penicillins of particular interest.

Cephalosporin Antibiotics

Antibiotic Production By Various Species Of Emericellopsis And Cephalosporium

R. P. ELANDER, J. F. STAUFFER *and* M. P. BACKUS, *Eli Lilly and Company, Indianapolis, Indiana, & University of Wisconsin, Madison, Wisconsin.*

In a study of natural and ultraviolet-induced variability in the fungus, *Emericellopsis terricola* var. *glabra*, several strains were shown to possess an enhanced capacity to produce cephalosporin antibiotics in both plate and shake-flask fermentation tests. Maximum yields obtainable from strain ETG Wis. 58-5-236b, the most recent member to be included in the Wisconsin series, were nearly two and one-half times that obtained from the original parental stock. The capacity of certain other species and varieties of Emericellopsis and Cephalosporium to synthesize cephalosporins is reported. Certain strains were shown to be capable of producing an antibiotic which inhibited the growth of several penicillin-resistant, penicillinase-producing *Staph. aureus* strains. The antibiotic material was acid-stable and resistant to the action of penicillinase. Chromatographic separation and differential bio-assay suggested that the antibiotic was not either cephalosporin. In certain respects, the material was similar to cephalosporins P.N.C. A schematic analysis for the detection of cephalosporin P, N and C, and an assay procedure involving *Vibrio cholerae* are also reported.

Anti-Fungal Agents

Organic Sulfur Compounds

Metabolic Effects Of Organic Sulfur Compounds On Neurospora

ROBERT FUERST *and* ROBERT W. HIGGINS, *Texas Woman's University, Denton, Texas.*

More than 60 thiophene derivatives and related sulfur containing organic substances were synthesized by one of the authors. Many of the compounds were tested for biological activity against tumors in C-57 black mice and for inhibition effects on the growth of *Neurospora crassa*. In liquid culture a comparison of relative activity of the sulfur containing compounds with some of the antineoplastic agents like 6-diazo-5-oxonorleucine, amethopterin, nitrogen mustard and others was made. In other investigations the "plate-well-method" was used to screen the thiophenes for inhibitory activity.

A number of thiophenes inhibited *Neurospora* growth but at the same time induced mycelial colonial formation in this organism. This phenomenon of paramorphism has been thoroughly studied. Some of these colonizers are: "1-(2-thienyl)-4-thiaheptane, 1-(2-thienyl)-6-methyl-4-thiaheptane, heptylthiophene, ethyl benzylthiodimethylethanoate, 2-(2-ethylhexyl) thiophene, 4, 10, dithiatridecane, 2-(2-methylpropyl) thiophene." These compounds differ in activity depending on what pathways of metabolism seem to be affected by the colonizing substance.

The effect of these thiophenes and other sulfur compounds was compared to carbohydrates that induce colonization and to some surface active anionic agents.

Some of the thiophenes caused paralysis and death when injected into mice. This appeared to be due to lysis of the erythrocytes in the animals.

1, 3, 5-Substituted Hexahydropyrimidines

In Vitro Antibacterial And Antifungal Activity Of Some 1, 3, 5-Substituted Hexahydropyrimidines

FRED A. BARKLEY, FRANK J. TURNER, ROLAND S. PIANOTTI, PATRICIA L. CARTHAGE *and* B. S. SCHWARTZ, *Warner-Lambert Research Institute, Morris Plains, N.J.*

Several series of substituted hexahydropyrimidines were tested for *in vitro* antimicrobial activity against various bacteria and fungi. In the 1-,3-bis- positions, the most active substituents were the octyl radicals such as the 1-methylheptyl and the 2-ethylhexyl; larger or smaller alkyl radicals in the same position cancelled or diminished activity, and aryl and aralkyl radicals in these positions caused the activity to be greatly reduced. When the 1, 3-bis-substitutions were in the active range, 5-hydrogen, 5-methyl and 5-ethyl substitutions produced compounds which all proved to be active. The 5-amino derivative was evidenced to be somewhat more active than the corresponding 5-nitro derivative. Consequently, one of the most active compounds, in *in vitro* testing, was 1-,3-bis(2-ethylhexyl)-5-amino-5-methyl-hexahydropyrimidine.

Activity of the parent base is little affected by the nature of the mineral acids usually employed in salt formation. Interesting changes in the antimicrobial spectrum and enhanced activity were observed frequently when certain organic acids were used in the formation of their salts. In contrast to the base, the trihydrochloride was readily soluble in water.

Some chelating agents, studied for possible employment to enhance the *in vitro* antimicrobial activity of the substituted hexahydropyrimidines, were found to produce some modifications of their effectiveness.

In an attempt to develop resistance, a number of transfers of organisms in dilutions of 1, 3-bis(2-ethylhexyl)-5-amino-5-methyl-hexahydropyrimidine were made, but no appreciable level could be demonstrated. In serial transfers of the trihydrochloride of the same compound, no appreciable increase in resistance was noted.

Poisons in Saccharomyces

Gene Controlled Resistance To Poisons In Saccharomyces

CARL C. LINDEGREN *and* ROBERT B. DRYSDALE, *Southern Illinois University, Carbondale, Illinois.*

About 70 different agents were screened for their toxic effects on different members of an inbred stock of Saccharomyces derived by intercrosses involving 6 or 7 different "species"; several thousand members of this stock were tested for their specific reactions against the different toxic agents. A culture was designated as resistant if it could continue to grow in the presence of a given concentration of the reagent while a sensitive culture was one which was incapable of continuing to grow in the presence of the reagent in the same concentration. It was possible to detect Mendelian segregation for sensitivity and resistance, by adjusting the concentration of the reagent and by exploiting different means of testing. Sensitive and resistant cultures were discovered for 27 of the reagents tested. Different single genes controlled resistance or sensitivity for each of 20 different agents. Simple Mendelian control could not be demonstrated for resistance and sensitivity to 7 agents. The resistance and sensitivity of cultures to closely related chemicals, such as nickel and cobalt, was determined by nonallelic genes. Eleven antibiotics did not inhibit any of the cultures tested. One agent was characterized by its ability to destroy the respiratory apparatus without having any other apparent effect.

Trichomycin, Pimaricin and Griseofulvin

In Vitro Comparative Study Of The Antifungal Activity Of Trichomycin, Pimaricin And Griseofulvin

PLUTARCO NARANJO *and* GALO HIDALGO, *Universidad Central and L.I.F.E. Laboratories, Quito, Ecuador.*

Antifungal activity of trichomycin (from *Streptomyces hachijoensis*), pimaricin (from *Streptomyces natalensis*) and griseofulvin (from *Penicillium griseofulvum*) was studied by using the *in vitro* method of serial dilutions. Minimum effective concentration (MEC) to inhibit completely the growth of yeasts and fungi until the sixth day of incubation at 28° C. was found for each antibiotic. Among the three antibiotics, trichomycin was the most active agent against *Candida albicans*. The MEC varied from 0.35 to 2.1 mcg. according to the strain of the yeast. Pimaricin was second in activity, its MEC was to 2 to 5 times higher than that of trichomycin. Griseofulvin was almost inactive against this microorganism. On several strains of *Microsporum canis*, griseofulvin was the most active agent and trichomycin the least. MEC of pimaricin was 2 to 3 times higher than that of trichomycin, 12 to 15 times higher than griseofulvin. On different species and strains of Trichophyton, on all but one *i.e. T. violaceum*, griseofulvin was the most active and trichomycin the least. On *T. violaceum* pimaricin was the most active.

On *Aspergillus fumigans* pimaricin was the most active agent and trichomycin the least.

Aminomycin

Aminomycin, A Novel Heptaene Macrolide Antifungal Antibiotic

EDWARD BOROWSKI, CARL P. SCHAFFNER, HUBERT LECHEVALIER *and* BENJAMIN S. SCHWARTZ, *Institute of Microbiology, Rutgers, The State University, New Brunswick, and the Warner-Lambert Research Institute, Morris Plains, N.J.*

Aminomycin, an antifungal antibiotic originally isolated in crude form by Woolridge and Hoffman and designated as 1968 (Nepera) is produced by a strain of *Streptomyces*. Aminomycin has now been isolated in pure form and identified as a member of a distinct group of the heptaene series of polyene antibiotics. Characteristically, all of these antibiotics may best be described as unsaturated macrocyclic lactones. The number and variety of functional groups and chemical moieties attached to the macrocyclic nucleus, and the degree of unsaturation, account for the great variety of polyenic antibiotics described to date.

Unlike most of the other heptaene antibiotics that contain amino sugar, which is bound glycosidically to the macrocyclic lactone, aminomycin possesses a different and as yet undefined amino sugar. This antibiotic also possesses a unique para amino phenyl radical and demonstrates a higher degree of basicity than is usually found with the other heptaene antibiotics.

The antifungal activity of aminomycin was compared *in vitro* with that of other heptaenes. *In vivo* biological studies with aminomycin have demonstrated the effectiveness of this antibiotic in the treatment of various mycotic infections. Aminomycin was found to be active against strains of *Candida, Cryptococcus neoformans, Histoplasma capsulatum,* and *Sporotrichum schenckii.*

Amphotericin B

The Effect Of Amphotericin B Upon Renal Function In Man

EVERETT R. RHOADES, EARL GINN, HAROLD MUCHMORE, WILLIAM O. SMITH *and* JAMES HAMMARSTEN, *Veterans Administration Hospital, Oklahoma City, Oklahoma.*

Amphotericin B has been shown to cause an elevation of BUN (blood urea nitrogen) in man. In order to assess further the effect of amphotericin B upon renal function a total of 14 patients treated with amphotericin B have been studied.

In only one patient was there no elevation of the BUN. Serial clearances of inulin and paramino hippurate before, during and after therapy have been done in two patients. Clearances were done in a total of 8 patients during treatment and a total of 7 patients after treatment was completed. The period from the time of the final dose of amphotericin B to the time of the clearance studies varied from 47 to 400 days. A decrease in the clearance of inulin (mean, 45 percent) and PAH (mean, 33 percent) was found in all but two of those patients on therapy. Similar decreases of smaller magnitude were found in all but two patients studied after completion of therapy. These were found in one case when a year had elapsed after therapy and in the other case in the patient who maintained a normal BUN throughout. Renal biopsies were done in two patients while on therapy and who had an elevation of BUN. These revealed thickening of the basement membrane and swelling of tubular epithelium. There appeared to be no correlation between the dose of amphotericin B and derangement of renal clearances. These studies indicate that amphotericin B is capable of causing decreased renal blood flow as well as decreased glomerular filtration. Such findings might be due to a diffuse effect upon the afferent arterioles.

Tetracycline Phosphate Complex and Amphotericin B

Tetracycline Phosphate Complex And Amphotericin B In The Treatment Of Urinary Tract Infections

HOWARD M. TRAFTON *and* HOWARD E. LIND, *Brooks Hospital, Brookline, Massachusetts.*

Preliminary work by others has indicated fewer side effects in patients treated with tetracycline when an antifungal agent is added. Fifty patients with urinary tract infections were treated for approximately 10 days with 1 capsule q.i.d. of tetracycline phosphate complex equivalent to 250 mg. tetracycline hydrochloride plus amphotericin B, 50 mg. Clinical response was good in 47, with elimination of or relief from symptoms, elimination or marked reduction of pyuria, and sterilization of urine in a number of cases, some of whom had demonstrated resistant organisms initially. The drug was well tolerated. Incidence of side effects was no greater than with other tetracyclines, and they were much milder. This was especially true of diarrheas. Glossitis, possibly due to emergent fungi, found in patients treated with tetracycline alone, was absent in this study.

Antifungal Agents

Toxicity And Absorption Studies In Humans Of Newer Antifungal Agents

HAROLD J. LYNCH, MICHAEL L. FURCOLOW, FRED E. TOSH *and* HOWARD W. LARSH, *U.S. Department of Health, Education and Welfare, Kansas City, Kansas.*

In a continuing search for suitable antifungal agents 36 drugs have been found whose tissue culture inhibitory dose is 10 mg. or less for *Histoplasma capsulatum*. Of these, 12 have been used to treat deep mycotic infection in 64 patients by our group. Nine of these agents have been used orally, of which 3 were antibiotics and 6 chemicals. Seven of these had blood level studies to determine absorption. Careful clinical observation for toxicity was maintained on all patients.

The antibiotics included pimaricin, a Dutch antibiotic; trichomycin, a Japanese antibiotic resembling candicidin; and oral amphotericin B (Fungizone) (Squibb). The chemicals included U-0178 (Upjohn); three diamine derivatives, 25948, 11220, and amoebicide (Lilly); Antibuse (Ayerst Laboratories); and M & B 938 (diamidinodiphenylamine) (May and Baker). With oral amphotericin B no great toxicity was noted, but no absorption could be demonstrated. Use of all of the other materials seemed to be limited by varying toxic manifestations, such as nausea, vomiting, and diarrhea, which appeared whenever repeated or significant dosage was attempted. Further attempts at improving absorption and decreasing toxicity are under way.

Polyene Antibiotics

Actions Of Polyene Antibiotics On Candida

S. G. BRADLEY, P. J. FARBER *and* L. A. JONES, *University of Minnesota, Minneapolis* 14, *Minnesota.*

Polyene antifungal antibiotics are produced by several streptomycetes. Of the many polyenes isolated, nystatin and amphotericin have proven useful clinically. Others which are still being evaluated include pimaricin, filipin and endomycin. Although polyene antibiotics inhibit respiration and fermentation in *Candida stellatoidea*, energy generation does not seem to be the primary physiological locus of drug action. Moreover, protein synthesis and ribonucleic acid synthesis are suppressed only after the yeast cell has been damaged extensively by the antibiotic. Candida, exposed to nystatin, loses substantial amounts of phosphate-containing substances. This suggests that polyene antibiotics act upon the permeation system. This hypothesis is supported by the finding that cell-free preparations ferment glucose in the presence of sufficient antibiotic to stop fermentation by intact cells. Additionally, reducing substances such as thioglycollate, cysteine and ascorbate protect Candida from fungistatic action of nystatin and amphotericin B, and potassium ions lessen the nystatin-inhibition of glycosis. The mechanisms of action of the polyenes studied here seem to be similar inasmuch as resistance to one drug confers resistance to the others.

Overt Monilial Disease

Factors Leading To Overt Monilial Disease

HENRY D. ISENBERG, JAMES I. BERKMAN *and* SEBASTIAN L. CARITO, *Long Island Jewish Hospital, New Hyde Park, New York.*

An earlier report from this laboratory categorized the usual bacterial residents of the human gastrointestinal tract as stimulatory, indifferent and inhibitory with respect to the growth of *Candida albicans*. The inhibitory activity of dialyzable end products of the bacteria implicated is the subject of this communication. The composition of the growth medium formed the basis for adding to cultures of *Candida albicans* crystalloid compounds in amounts equivalent to the theoretical yields obtained from the starting materials. Thus, end products of carbohydrate and nitrogen metabolism including tri, di and mono carboxylic acids, amines, amides, inorganic oxidized nitrogen and hydrogen sulfide as well as diverse end products such as acetoin and its reduced derivatives, propylene and butylene glycol were tested under aerobic, microaerophilic and anaerobic conditions. In addition, some artificial compounds synthesized to contain the anticandidal effect of certain functional groups implicated in this study, were tested. Results indicate that of the more than 100 compounds examined a certain number displayed inhibitory properties in concentrations obtainable during the growth of the bacteria. The implications of these results in view of the overall picture of monilial disease will be discussed.

Anti-Tumor Agents

Cytotoxicity Test

Experiences With A Cytotoxicity Test As A Primary Screen For Detection Of Antitumor Agents

B. HEINEMANN *and* A. J. HOWARD, *Research Division, Bristol Laboratories, Syracuse, New York.*

A total of 722 fermentation beer filtrates obtained from streptomycetes were tested for cytotoxicity against KB cells in a dilution test and in experimental tumor systems in animals, including sarcoma 180, mammary adenocarcinoma 755, and lymphoid leukemia L-1210. Two filtrates passed both the cytotoxicity and tumor screen, two passed the tumor screen only, 90 passed only the cytotoxicity screen, and 628 failed to pass either screen. Forty-six culture filtrates which had

already passed an *in vivo* tumor screen were tested for cytotoxic activity; 33 were found to be inactive and 13 active. The use of the cytotoxicity test for screening fermentation beer filtrates for potential antitumor activity is discussed.

Actinomycin P^2

Isolation And Characterization Of Actinomycin P^2

K. V. RAO *and* D. W. RENN, *The John L. Smith Memorial for Cancer Research, Chas. Pfizer & Company, Inc., Brooklyn 6, New York.*

Ever since its original isolation form *Streptomyces antibioticus* in 1940, actinomycin has been attracting considerable interest in view of its interesting biological properties as well as its unusual aspects of chemistry. Numerous actinomycins have been isolated and these have been classified according to their behavior on paper chromatography. We have isolated an actinomycin from a culture of *Streptomyces aureofaciens* which has shown a somewhat lower toxicity than the actinomycins B, C or D. This is present to the extent of about 0.5% of the total actinomycins of the broth, the major portion being actinomycin B.

The crude actinomycin is recovered from the broth by solvent extraction, and the bulk of the B-component removed by chromatography on alumina. The slower moving fraction is comprised of three components termed P^1, P^2, and P^3 and these were separated by countercurrent distribution. Of these actinomycin P^2 is the major one and also of the least toxicity. This was purified until it appeared as homogenous by paper chromatography. Actinomycin P^2 is an orange crystalline solid with physical and chemical properties similar to those of the other actinomycins. It shows an Rf value of 0 in a system described by Waksman *et al.*, and a value of 0.5-0.6 in a benzene-formamide system. Actinomycin P^2 exhibits a high degree of activity against Adenocarcinoma 755 and moderate activity against Sarcoma 180 in mice at doses of 0.5-1.5 mg./Kg. body weight.

Actinomycin and Antimycin A

The Production Of Two Structurally Unrelated Antitumor Agents, Actinomycin And Antimycin A By Streptomyces Antibioticus Cultures

GERALD W. CAMIENER, ALMA DIETZ, ALEXANDER D. ARGOUDELIS, GEORGE B. WHITFIELD, WILLIAM H. DEVRIES, CHARLES M. LARGE *and* CHARLES G. SMITH, *Research Laboratories, The Upjohn Company, Kalamazoo, Michigan.*

The novel and hitherto unreported production of both antimycin A and actinomycin by *Streptomyces antibioticus* strains was studied. No other streptomycete tested had this dual capability. The actinomycin was inititally found in beers by means of antibacterial bioautographic techniques; the antimycin A component was additionally found to be present by the use of tissue culture bioautography versus KB cells. Both antibiotics were purified to crystallinity using tissue culture and spectrophotometric assay procedures, and the crystalline materials were characterized as an antimycin A complex and an antimycin F or Z complex by comparison of their physical and chemical properties with reported data. Both antibiotic complexes have *in vivo* antitumor activity in mice and these antibiotics are currently undergoing extended *in vivo* evaluation.

Laboratory Studies

Clinical Isolates

Local Ecologic Variation In Clinical Isolates

BERT H. LEMING, JR., *University of Tennessee and City of Memphis Hospitals, Memphis, Tennessee.*

Although known to today's scientists, the majority of pathologists, bacteriologists, and clinicians have failed to comprehend the local ecologic variation in clinically isolated microorganisms. The current problem of increasing organismal resistance, which greatly involves the latter groups, requires more localized activity by said groups and the dissemination of such information is paramount in order to hasten a solution. This paper deals extensively with data on microorganismal susceptibility of approximately 15,000 clinical isolates, including both gram negative and gram positive varieties. Testing by the disc-plate method was carried out with periodic two-fold tube dilution checks. Also presented is specific information as to source of material, type of lesion, and other pertinent clinical data. Graphic illustrations of monthly and seasonal variations are presented to show that the practicing physician should constantly utilize bacterial culture and sensitivity tests as a guide for effective antimicrobial therapy. In addition to monthly and seasonal variation, there is a demonstration of significant local (county to county and hospital to hospital within the community) variation. Findings to date definitely discredit the practice of depending upon past experience and/or clinical judgment as the sole criteria for selection of antibacterial therapy.

Antibiotics Bactericidal Tests

Antibiotic Bactericidal Studies: II. Bactericidal And Bacteriostatic Tests With Various Antibiotics

R. H. OTTO, ELEANOR F. ALFORD, W. E. GRUNDY *and* J. C. SYLVESTER, *Abbott Laboratories, North Chicago, Illinois.*

An important characteristic of an antibiotic is its bactericidal activity; however, different methods frequently show conflicting results, as regards this action. The present study was designed to determine the minimum inhibitory concentration and the minimum bactericidal concentrations of antibiotics using the same, improved method for all tests. A standard two-fold tube dilution, modified by incubation of the tubes on a reciprocal shaker for 48 hours was used. Viable cells were determined by plate counts at various times and sterility tests were made at 48 hours. Shaking of the broth tubes promotes rapid growth of a culture, the study of a greater portion of the growth cycle, a shorter time interval and intimate contact of antibiotic and cells. For routine studies, a simplified shaker test is used. One-tenth ml. of each broth tube is plated and sterility tubes inoculated at 24 and 48 hours. It has been demonstrated that this shaker tube method gives reproducible results with commonly used antibiotics, can be used with gram positive and gram negative bacteria and provides reliable information as to the bactericidal activity of antibiotics.

Antimicrobial Activity by Radioisotope Method

Determination Of Antimicrobial Activity By A Radioisotope Method

ALLEN H. HEIM, JAMES A. CURTIN *and* GILBERT V. LEVIN, *Schools of Medicine and Dentistry, Georgetown University, Washington 7, D.C.*

The antimicrobial activity of various antibiotics (penicillin, tetracycline, oxytetracycline, chloramphenicol and erythromycin) is determined by using a radioisotope method. The method is a modification of the one used by Levin *et al.* for detection of coliforms. As used for determining antimicrobial sensitivity, the test organism is placed into trypticase soy broth containing C^{14} sodium formate. The rate of bacterial metabolism is measured by the detection of $C^{14}O_2$ released. The effect of various concentrations of antibiotics upon the metabolic rate is compared with controls; sensitivity to the antibiotic is indicated when decreased amounts of $C^{14}O_2$ are released whereas insensitive organisms produce $C^{14}O_2$ at rates equivalent to antibiotic-free controls.

The data show that antibiotic sensitivity of bacteria isolated from patients can be determined within 4 to 5 hours. The data are in agreement with concurrent sensitivity tests using the tube dilution method which requires 24 hours. The application of the radioisotope method to the direct determina-

tion of sensitivity of bacteria in material freshly obtained from patients is currently being investigated.

Demethychlortetracycline, Tetracycline, Combination of Tetracycline and Novobiocin

Antistaphylococcal Activity Of Sera After Oral Doses Of Demethylchlortetracycline, Tetracycline, And A Combination Of Tetracycline And Novobiocin

JAMES E. GREER, *Department of Dermatology, Henry Ford Hospital, Detroit 2, Michigan.*

The sera of 12 normal adults were titrated for antistaphylococcal activity by use of two-fold broth dilutions in a double-blind triple-crossover study. Oral doses of 2 capsules of either (A) Declomycin (demethylchlortetracycline, 150 mg., Lederle), (B) Panmycin phosphate (tetracycline phosphate complex equivalent to 250 mg. hydrochloride, Upjohn) or (C) Panalba (tetracycline phosphate complex equivalent to 250 mg. hydrochloride, plus novobiocin sodium, 125 mg., Upjohn), were given at weekly intervals to six pairs of subjects in random sequence. Blood samples were collected after 0, 2, 4, 6, and 24 hours. Of the 4 test organisms, one was susceptible to both tetracycline and novobiocin, one resistant to both, and one each was susceptible to one antibiotic but not the other. Results failed to show increased activity by the tetracycline-novobiocin combination; indeed, tetracycline alone was slightly superior to the other 2 preparations. Four additional subjects were used in a double-crossover study with oral doses of 3 capsules each of preparations (B) and (C). The resulting antibacterial activity was again slightly greater following ingestion of tetracycline alone than after the tetracycline-novobiocin combination, suggesting suppression of the novobiocin activity. Use of the cup-plate method with these sera likewise failed to show increased activity with the combination, for zone sizes were larger with sera obtained following doses of tetracycline alone. Also, several hundred staphylococci were tested in pure culture by the agar-diffusion method with discs, impregnated with 30 mcg. tetracycline or 30 mcg. tetracycline plus 15 mcg. of novobiocin, without demonstrating any advantage to this method of testing or to the combination.

Tetracycline and Novobiocin as Combination

Interference Of Tetracycline And Novobiocin When Administered As A Combination Antimicrobial Agent

E. L. FOLTZ *and* BETTY S. GRAVES, *School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania.*

Studies in this laboratory have shown that combinations of tetracycline and novobiocin when administered as a single antimicrobial agent mutually interfere with the absorption of these antibiotics as reflected in serum concentrations.

When an oral dose of 500 mg. tetracycline plus 250 mg. of novobiocin was administered to healthy adults and compared with similar doses of each of the antibiotics singly in the same subjects, it was found that with combined drugs there was approximately 20 percent diminution in the serum concentrations of tetracycline and 40-50 percent diminution in novobiocin concentrations.

When the dosage form was changed to liquid oral preparations, low concentrations of each of the antibiotics occurred in the paired agent.

In the intramuscular administration of the combined drug, novobiocin concentrations were lower than those resulting from novobiocin alone in equal dose.

These observations point out that there is mutual interference with the pharmacologic properties of a combination when compared with the single agent. This is true for all dosage forms. The significance of these findings will be discussed.

Evaluation of Antibiotics against Pseudomonas Isolates

In Vitro Evaluation Of The Commonly Used Antibiotics Against Pseudomonas Isolates

J. P. TRUANT, *Department of Laboratories, Henry Ford Hospital, Detroit 2, Michigan.*

The frequency and intractability of hospital infections with Pseudomonas species has been of considerable interest to us during the past six years. The *in vitro* susceptibility patterns of 1000 Pseudomonas strains have been studied using three procedures, (a) the tube dilution technique, (b) cup-plate assay and (c) the disk method. The majority of commercially available chemotherapeutic agents have been tested. Polymyxin B, chloramphenicol, streptomycin, nitrofurantoin, kanamycin, neomycin and methenamine mandelate showed some activity against the variety of strains. The results show conclusively that polymyxin B and methenamine mandelate are effective *in vitro* against 90 percent of the strains. Chloramphenicol, kanamycin, nitrofurantoin, neomycin and streptomycin show some activity against 10-20 percent of the isolates. These studies also show a marked decline in the susceptibility of Pseudomonas strains to chloramphenicol and streptomycin during the past 6 years. Combinations of chloramphenicol, neomycin and polymyxin have also been studied and used to treat pseudomonas eye infections which were induced experimentally in rabbit cornea.

Nitrofurans

The Effect Of Nitrofurans On The Survival Of Bacteria In Vivo

WARREN F. CAREY, H. ERIC RUSSELL *and* JOHN R. O'CONNOR, *The Norwich Pharmacal Company, Eaton Laboratories Division, Norwich, New York.*

In order to assess more closely the susceptibility of bacteria to nitrofurans, a surgical technique was developed which permitted this interaction to take place *in vivo* while excluding host defense factors. Cellophane dialysis sacks containing bacterial suspensions were inserted intraperitoneally or subcutaneously into mice or rats. Following the oral administration of furazolidone or furaltadone to these animals, the sacks were removed and assayed for viable cells. Results were related to those obtained by the intraperitoneal inoculation of bacteria. Nitrofurans were readily diffusible through the cellophane membranes and by the substitution of water in these sacks, the *in vivo* concentrations were determined. The rise and fall of drug concentrations paralleled those obtained by serum analysis.

Sporicidal Activities of Aldehydes

Sporicidal Activities Of A Number Of Aldehydes

VELMA L. CHANDLER *and* ROLLIN E. PEPPER *Ethicon, Inc., Somerville, New Jersey.*

Our investigations have shown that of the aldehydes and dialdehydes we evaluated, glyoxal and glutaraldehyde (both dialdehydes) possess excellent sporicidal activity. In alkaline-alcoholic formulations both exhibit rapid kill of bacterial spores. Whereas glyoxal is inactive in alkaline-aqueous solutions, glutaraldehyde is highly active. The shelf-life of the alcoholic glyoxal solutions is short (1 month); activity is retained in the alcoholic glutaraldehyde for at least 7 months and in alkaline-aqueous systems for one to two months. Sodium bicarbonate is the alkalinizing agent of choice and isopropanol is the only alcohol effective in the formulations. There exists an interdependence of sodium bicarbonate and isopropanol concentrations for sporicidal activity. Serum does not decrease the sporicidal activity of alkaline-alcoholic glutaraldehyde solutions as it does with alcoholic formaldehyde. The two dialdehydes have the advantage of not giving off noxious vapors although they do possess certain unfavorable reactions when instilled in eyes or used repeatedly on the hands.

Antistreptolysin O

The Elevated Antistreptolysin O Titer Of Pooled Human Gamma Globulin

MURRAY M. STREITFELD, *University of Miami School of Medicine, Coral Gables, Florida.*

Pooled normal human gamma globulin has been seen to exert therapeutic activity and to markedly potentiate antibiotic activity in *Streptococcus pyogenes* infections. In seeking to understand the mechanism of this protection, the effect of gamma globulin on the various streptococcal components and metabolites implicated in virulence were investigated. The results of the *in vitro* titration of gamma globulin activity against the oxygen labile streptolysin are reported. It was found that: (A) Streptolysin O hemolytic activity was inhibited by very low concentrations of gamma globulin; assay end-point titers of antihemolytic activity were ten to fifteen fold the average serum titers previously observed in normal human population surveys; (B) six different commercial preparations of pooled human gamma globulin were equally effective as inhibitors of the hemolytic activity of streptolysin O. The observed high antistreptolysin O titer of gamma globulin may account in part for its demonstrated therapeutic efficacy; the protective role of antistreptolysin O as compared to other antistreptococcal antibodies will be discussed. Experiments testing the effectiveness of gamma globulin against other components of streptococcal virulence are currently in progress.

Testing of Antibiotics

The Use Of Blood Serum As Test Medium In The In Vitro Evaluation Of Antibiotics

R. N. WOLFE *and* J. M. MC GUIRE, *Lilly Research Laboratories, Indianapolis, Indiana.*

Blood serum was given consideration as a bacteriological medium for *in vitro* testing of antibiotics with the thought that it may be more representative of body fluids than the commonly used commercial laboratory media. Investigation revealed that although some species did not grow well in serum, staphylococci grew rapidly; hence, this important pathogenic group was available for comparative studies in serum and traditional nutrient media. Subsequent experiments were conducted to determine the activity of 20 antibiotics on staphylococci in serum. Some antibiotics appear more potent in serum than in broth; some appear less active; and the activities of some were similar in both. Comparative tests in serum and broth should be useful for the detection of total effects of serum upon the action of antimicrobial agents, and for studies to determine the mechanism of the effects of serum. Changes in the *p*H of serum during incubation of tests were found to exert significant effects upon the action of antibiotics. A simple procedure for controlling this variable was developed.

Antibiotics Having Erythromycin Antibacterial Spectra

Comparative Studies With Five Antibiotics Having Erythromycin Antibacterial Spectra

L. GREENBERG, A. MANIAR *and* L. EIDUS, *Biologics Control Laboratories, Laboratory of Hygiene, Department of National Health and Welfare, Ottawa, Canada.*

Comparative *in vitro* and *in vivo* tests were conducted on 5 antibiotics having similar antibacterial spectrums. Using the tube dilution test and *Diplococcus pneumoniae* as the test organism, the effectiveness of these drugs *in vitro* fell in the following order: erythromycin, spiramycin, carbomycin, oleandomycin and novobiocin. To determine the affinity these antibiotics have for body tissues, groups of mice were injected subcutaneously with a single dose of 100 mg./Kg. of body weight. The animals were sacrificed after 6, 18 and 24 hours and the concentration of antibiotics in the organs was determined. The highest tissue levels and greatest retention of antibiotics in the tissue were found with spiramycin and next were erythromycin and oleandomycin. Carbomycin and novobiocin were found to have lower tissue levels and were eliminated rapidly from the body. Similar results were obtained in experiments with monkeys. In protection studies with mice treated with these antibiotics 3 and 6 hours before challenge with *Diplococcus pneumoniae,* complete protection was afforded by spiramycin. The other antibiotics gave only slight protection to the test animals. These results suggest that an antibiotic with high affinity for tissues may afford greater protection than antibiotics having little affinity for tissues.

Erythromycin Derivatives

Laboratory Observations On Three Erythromycin Derivatives In A Triple Cross-Over Study

BORIS SHIDLOVSKY, AARON PRIGOTT *and* WILLIAM R. DICKENS, *Harlem Hospital, Department of Hospitals, New York, New York.*

When the clinical potentialities of new antibiotics are established, modification of their molecular structure is frequently undertaken to find a form with increased efficiency. Three erythromycin derivatives: the base (Ilotycin), erythromycin propionate (Ilosone) and erythromycin stearate (Erythrocin) resulted from such further chemical explorations. In 60 hospitalized patients these preparations were employed orally in a triple cross-over technique to compare their respective activity as assayed in blood serum before and after food intake and their excretion rates. On a single dose of 250 mg., the propionate and stearate derivatives produced longer lasting activity than the erythromycin base. The basic form, however, exhibited greater activity than did either of the others. Levels for erythromycin propionate and stearate were in the same range as the base at three and four hour intervals and greater than the base at six and eight hours. More prolonged and greater activity for erythromycin propionate and stearate resulted when the dose was increased to 500 mg., while that of the base was substantially unchanged.

In general, greater activity was assayable in fasting serum from the erythromycin base, while the activity levels of the propionate and stearate preparations were not reduced by consumption of food. At both dosages, the excretion of erythromycin base appeared earlier and in greater concentrations than was demonstrable with either the propionate or stearate derivatives.

Propionyl Erythromycin Lauryl Sulfate

A Clinical And Laboratory Evaluation Of Propionyl Erythromycin Lauryl Sulfate In Soft Tissue Infections

ROBERT F. MORTON *and* BORIS SHIDLOVSKY, *Harlem Hospital, Department of Hospitals, New York, New York.*

Propionyl erythromycin lauryl sulfate, a new salt of erythromycin, demonstrated higher activity in animal and human serum after oral administration than did the antibiotic base. These findings were confirmed in a triple cross-over assay at this hospital which employed erythromycin base, erythromycin stearate, and propionyl erythromycin lauryl sulfate. In a study of 106 adult patients with soft tissue infections, propionyl erythromycin lauryl sulfate was used in conjunction with surgery or supportive measures. In 90 cases, the clinical response to the antibiotic was good. Not infrequently surgery could be avoided and, when necessary, was less extensive than ordinarily required in comparable cases. In 10 cases where the therapeutic results were not satisfactory, bacteriological determinations disclosed mixed microorganisms or resistant *Staphylococcus aureus* as responsible for the infections. In six burn cases proper evaluation could not be made. Complaints of gastrointestinal side effects necessitated withdrawal of the medication in 3 cases. This new erythromycin preparation is a valuable adjunct in the management of soft tissue infections.

Propionyl Erythromycin and Propionyl Erythromycin Lauryl Sulfate

Comparison Of Antibacterial Activity In The Sera Of Subjects Ingesting Propionyl Erythromycin And Propionyl Erythromycin Lauryl Sulfate

R. S. GRIFFITH, *Lilly Laboratory for Clinical Research, Indianapolis, Indiana.*

Two important modifications of erythromycin have improved its absorption following oral administration. The formulation of the propionyl ester of erythromycin changed the *p*H from 8.3 to 6.9, thus increasing oil solubility and absorption. Studies have shown at least a twofold increase in serum concentrations following propionyl erythromycin administration when compared to sera from subjects given erythromycin base. Decreased excretion by the liver accounted, in part, for higher blood levels of the ester than the base. Both the base and the ester were partially destroyed by gastric acid, causing less absorption of active material. Further improvement was accomplished by preparing the lauryl sulfate salt, propionyl erythromycin, which was found to be not only tasteless but acid stable. Data are presented showing results of a cross-over study. Equal doses of propionyl erythromycin and propionyl erythromycin lauryl sulfate produced serum concentrations practically identical for both preparations when administered to fasting subjects. Equivalent results were obtained when propionyl erythromycin lauryl sulfate was given with food. However, a marked decrease in serum concentration was noted when propionyl erythromycin was given with food. The demonstrated superiority of absorption of propionyl erythromycin lauryl sulfate makes it the preferred form of erythromycin for clinical use.

7-Chloro-6-demethyl-chlortetracycline and Pyrrolidino-methyltetracycline

Comparative Clinical And Experimental Investigations Concerning Tissue—And Serum—Concentrations Of 7-Chloro-6-Demethyl-Chlortetracycline And Pyrrolidino-Methyltetracycline Under Pathological Conditions In Man

H. P. KUMMERLE *and* H. CONTZEN, *Chirurgische Universitatsklinik, Frankfurt, Germany.*

In extensive experimental investigations (estimations of tissue —and serum—concentrations) under pathological conditions —gained during operations—after application of 7-chloro-6-demethyl-chlortetracycline and pyrrolidino-methyltetracycline with different amount and length of the doses, we tried to find the level of concentration in various organs and tissues. Furthermore, we checked whether there are any relations between serum and tissue-concentrations under pathological conditions and the consequences for the therapy in behalf of amount and length of application. With single and parallel—estimation with ten different organs and tissues after single and repeated applications of these substances, we studied the problem of the organ specific resorption, distribution and concentration of 7-chloro-6-demethyl-chlortetracycline and pyrrolidino-methyltetracycline. Also we studied the localization of these substances by histochemical methods in the various tissues. A discussion about the problem of the cumulation of these substances is added.

Tetracycline Analogues

Further Studies On The Fluorescence Of Tetracycline Analogues In Pathologically Altered Tissues

P. MALEK, J. KOLC *and* F. ZAK, *Institute for Clinical and Experimental Surgery, Prague Budejovicka 800, Czechoslovakia.*

Macroscopic or microscopic studies of the distribution of tetracycline analogues (TA) by means of fluorescence are the best methods to study the absorption of TA by pathologically altered tissue. The method of fluorescence revealed new aspects hitherto not demonstrated by other methods, such as the absorption by bone tissue under physiological or pathological conditions, absorption by tumorous tissue or absorption by fatty necroses in acute pancreatitis. This study is a continuation of former systematic studies of the distribution of TA in the organisms by means of a fluorescence method and draws attention to further findings, hitherto not mentioned in world literature. The absorption of TA under pathological conditions changes significantly although differently in individual tissues. In shock in the kidney CTC fluoresces only in the medullary substance and not in the cortex. In experimental staphylococcal infections of the kidney, fluorescence is particularly intensive in the area of the abscess.

The conclusions of these studies are of great practical significance for the choice of the individual TA in different pathological changes. From the viewpoint of its distribution in the kidneys CTC is more advantageous in staphylococcal cortex lesions whereas OTC is more advantageous in cases of pyelonephritis.

Oxytetracycline

Clinical And Serum Level Studies With An Intramuscular Preparation Of Oxytetracycline (Terramycin)

I. R. STILLMAN, *Royal Hospital, Chesterfield, England.*

Results are presented of an investigation which has been undertaken with a preconstituted solution of oxytetracycline (Terramycin, Pfizer) for intramuscular injection. A total of 95 patients, of whom many had been admitted to hospital with acute surgical conditions, received treatment with this preparation.

The main purpose of the investigation was the assessment of the serum antibiotic levels provided by six differing regimes of administration of the intramuscular preparation. In 13 patients an injection of 250 mg. was given 6 hourly; in 10 patients 250 mg. was given 8 hourly; in 12 patients 250 mg. was given 12 hourly and in 20 patients 250 mg. was given 24 hourly. In a further 20 patients, 250 mg. was given as a single injection on the first day, and subsequently on alternate days only. Finally, 20 patients received a single injection of 250 mg. on the first and subsequent alternate days, together with a single injection of 100 mg. on the intervening days.

In addition the response to treatment and the local tolerance to the injection were noted for each patient. Adequate serum levels for mild or moderate infections (0.6 mcg./ml.) were provided by a single 250 mg. injection every 24 hours. For very severe infections the serum level results indicate that several injections may be given with advantage during the first 24 hours, followed by a single 250 mg. injection each subsequent 24 hours.

There were no serious untoward reactions to treatment in this series. Mild local intolerance was observed very infrequently, and only in ambulant patients. The response to therapy was considered excellent, except in those regimes where less than 250 mg. 24 hourly was administered.

Mexaform® Combination

The Influence Of Mexaform® Combination On The Intestinal Flora Of Rats

P. C. EISMAN, J. WEERTS, D. JACONIA *and* S. S. BARKULIS, *Research Department, CIBA Pharmaceutical Products, Inc., Summit, New Jersey.*

This report deals with the effect upon the intestinal flora of rats of Mexaform, which consists of a mixture of 2 synthetic intestinal disinfectants; namely, Vioform® and Entobax®, and an antispasmodic, Antrenyl®. This combination exerts a therapeutic effect upon enteritis of differing infectious etiology, including that associated with overgrowth of *Candida albicans*. An earlier report has shown that one of these components (Entobax) markedly stimulates the growth of intestinal coliforms when administered orally to rats. It was of interest to study the effect of Mexaform upon the numbers of coliforms total aerobic bacterial count, and yeasts in the intestines of normal rats, as well as in rats previously given Aureomycin. The feeding of rats with 0.5 percent Mexaform in ground food results in a several hundred-fold increase in the coliform count, a significant though less marked increase in total aerobic bacterial count, and a corresponding marked decrease in the numbers of intestinal yeasts. In another experiment, animals pretreated with Aureomycin showed an increase in fecal yeast numbers. The addition or substitution of Mexaform to this diet decreased the yeast count and changed the bacterial flora as indicated above. These findings support the view that the normal intestinal flora exert an ecologic barrier to the abnormal multiplication of any one intestinal inhabitant and of the occasional pathogen which may gain access to the intestinal tract.

Blood Levels of Penicillin

Relative Merits Of Serum Dilution And Cup Plate Assays For Determination Of Blood Levels Of Penicillin, With Some Obsevations About The Use Of Diluents In Both Methods

P. BUNN *and* R. KNIGHT, *Department of Medicine, State University of New York, Syracuse, New York.*

This study was done to compare results between 2 assays which measure *in vivo* concentrations of penicillin. This is needed because there have been many discrepant reports from a number of laboratories with respect to blood levels following the administration of various penicillin products to man. Measurement of concentrations of different penicillins in blood were determined by cylinder cup plate assay using *Sarcina lutea* as the test organism and by serial dilution technic using Staphylococcus 209 P as the test organism. The preparations studied were benzyl penicillin (G), phenoxy methyl penicillin (V), phenoxy ethyl penicillin or phenethicillin (152) and 2, 6 dimethoxy phenyl penicillin (1497). Blood samples were measured at 1, 2 and 4 or 5 hours following single comparable doses to normal adults.

Although the average levels done by the serial dilution method using normal serum were in agreement with those obtained by the cup plate assay, individual levels were quite variable. Blood levels following different penicillins were not comparable, irrespective of assay used or similarity in doses given. No penicillin produced levels which could be compared with any other penicillin.

Five conclusions are evident: There are marked differences in concentrations of each of 4 penicillins (G, V, 152, 1497) when measured by the 2 generally accepted technics for assaying levels. Individual levels are less variable with cup plate method than with serial dilution test. Use of normal serum as the diluent in both assays is followed by more comparable results between the 2 assays. 1.75 percent bovine albumin solution is an adequate substitute for normal serum in the cup plate method. Although doses of administered penicillins were similar with respect to antibacterial activity and weight, comparisons of their blood levels is not possible.

Subacute Listeriosis

Production And Therapy Of Subacute Listeriosis In Mice

H. P. R. SEELIGER, M. CARMEN DEL PLAB *and* F. SULZBACHER, *Institute of Hygiene, Freidrich-Wilhelm Universitat, Bonn/-Rh., Germany.*

By choice of an infectious dose of 2.3 x 10^6 organisms of *L. monocytogenes* strain Li 613, a subacute Listeria infection of mice was produced which did not kill most of the animals within 26 days. When the animals were killed after this period 80 percent of the untreated ones still harbored living Listeria in the livers.

After subacute listeriosis could be produced with regularity, therapeutic studies with various antibiotics were performed on groups of 25 animals. The percentage of bacteriological cures was established after 26 days and the statistical error was calculated.

From this it was apparent that administration of tetracycline (Achromycin was used throughout all experiments) was followed by the highest rate of bacteriological cures.

In a hitherto unpublished series of experiments the observation time was prolonged to 87 days and 100 mice were used. 26 untreated mice died from the infection during the first 28 days of observation and 4 animals were killed on the 30th day. All were bacteriologically positive for Listeria. The remaining 70 animals were divided into 3 groups. The first group (20 animals) was not treated, the second (25 animals) received "Omnadin" and the third (25 animals) received Achromycin (500 mg. daily subcutaneously for 5 days).

On the 57th day 4 animals were sacrificed in group 1, and 5 in group 2; 8 of those animals were Listeria-positive. Of the 5 animals sacrificed in group 3 after treatment with Achromycin 4 were negative and only 1 positive. Subsequently the remaining animals of the 3 groups were divided into two portions. From these results it was obvious that in all animals which received Achromycin, the rate of bacteriological cures was significantly higher than in the controls of those treated with Omnadin. Two courses of Achromycin treatment cured all animals of chronic Listeria infections. In the light of recent observations on chronic listeriosis in the female genital tract and its possible relation to habitual abortions, the above results may be of general interest and indicate the therapy of choice. As a matter of fact tetracyclines have repeatedly been administered with success in cases of habitual abortions which according to serological tests were probably of listeric origin.

Syncillin and Penicillin

The Differentiation Of Degrees Of Sensitivity To Various Penicillins By Use Of Single Syncillin Discs

ARNOLD BRANCH, D. H. STARKEY *and* EDNA E. POWER, *Department of Veterans Affairs Hospital Laboratories, Lancaster, New Brunswick and Montreal, Quebec, Canada.*

A panel of 35 coagulase positive staphylococci was chosen with *in vitro* sensitivities ranging from 0.05-200 units to penicillin G by the tube dilution method. These were tested by a similar tube dilution method with Syncillin and the new penicillin (Staphcillin, Bristol Laboratories). Besides these, disc sensitivity tests were performed with 2 penicillin G discs, 2 and 10 units respectively, and 3 Syncillin discs 2, 5 and 10 mcg. It was found that the results with the Syncillin discs enabled a clear cut differentiation into three categories of sensitivity when the results of the zone sizes were charted and these corresponded with the three categories of sensitivity to penicillin G. This strongly suggests that the *in vitro* sensitivity testing with Syncillin discs alone may enable the laboratory to indicate to the clinician the degrees of sensitivity to all penicillins. This may be more accurate than using penicillin G discs which in our hands show greater variability. The relatively slow diffusion of Syncillin and its slower destruction by penicillinase may be the reasons that discs produce this constant effect.

HUMAN MOTIVES IN COMMUNICATIONS

by JOSEPH P. CRISALLI

► IN HOSPITALS, AS IN ALL ORGANIZATIONS COMPOSED of specialists in several fields working together, the art of communicating properly assumes immense proportions. Each specialist is tainted, as it were, by his own field of knowledge. To work as a team in the accomplishment of our mission, understanding is necessary and compromise is often required. This talk is directed primarily to the pharmacist whose services span a large number of units and whose activities affect a large number of people. It is written in the belief that much has been said about kinds and contents of communciation media but very little about those to whom communications are directed. After all, if we do not convey meaning, our media has been ineffective.

JOSEPH P. CRISALLI, is Chief, Pharmaceutical Service, U. S. Public Health Service Hospital, Norfolk, Virginia.

Presented during the Annual Meeting of the U. S. Public Health Service Clinical Society in New York, May 5, 1960.

Human Motives in Communication

Communication involves a transfer of meaning as intended by a communicator. Communication has been defined as all the processes through which information, attitudes, ideas and opinions are transmitted and received, providing a basis for common understanding. To be effective, a communication must have clarity to facilitate understanding, and consistency so as not to cause bewilderment. Communication must be adequate, properly timed, have adequate distribution and adaptability. Adaptability is important for acceptance, for it means fitting our communications into the work complex on the one hand and into the work patterns as interpreted by the recipients of our communications on the other.

Every year millions of dollars are spent by business and government to produce the calculated effect upon recipients of communications. This usually involves influencing the listener to adopt a suggested course or to 'change his mind.' *Fortune* magazine says that most of this communication falls on deaf ears "because we are inept at communicating ideas and information which create understanding among people who work together."

We sometimes hear a person say that he finds it difficult to get through to another individual. This is because he does not speak to him through the world with which the latter is familiar. Psychologists say that in our struggle with our environment to satisfy our needs, we selectively determine what is good and what is not so good for us; what brings us success and where we continually fail, and in the process attitudes are developed. These, in composite, serve as a frame of reference that fashions our views and behavior. Attitudes may be based on rational considerations, on irrationality, or even on strong emotional bias of which an individual may be wholly unaware. To reach such an individual, we must understand him and wean him from his views. In the process we will have communicated with him.

Ambiguous Stimulus

The problem of communication is concerned not only with what person "A" has to say to person "B" but also with what "B" *hears,* if he *accepts it, integrates it* into his view and *acts on it* rather than distorting, rejecting or hiding it away. One major mistake commonly made is to assume that a listener gets the very same meaning out of what we say that we intend. Some knowledgeable people hold that one of the reasons why "B," the listener or recipient of information, gets a meaning different from what is intended out of what "A" says or writes lies in the fact that "A" assumes "B" has enough knowledge of the subject under discussion to enable him to fill in the gaps in his communication. In doing this "B" may proceed in a way, very different from what is desired. The information transmitted to "B" was not enough for him to proceed as desired. He was given what one author calls 'an ambiguous stimulus.'

When the Pharmacy Committee recommends that the use of a certain drug be confined to hospitalized patients, those of us with more experience realize that exceptions must be entertained and this is left to the pharmacist's discretion. If we say to our novice pharmacist, "No more of such and such drug goes to outpatients," we may well be headed for trouble. Without experience the novice tries to live by the letter of the law. Under certain conditions repercussions will occur. Who or what was to blame? Certainly not the novice who will probably bear the brunt of our wrath. There is no doubt that we were ambiguous in our communication.

Motivations and Emotions

A second point to consider is the manner in which motivation and emotions color the communications we receive. The chief pharmacist finds his inventory incorrect. He casually mentions to a co-worker that all of us must exercise greater care in withdrawing drugs from stock. He says this within earshot of an employee who usually has charge of storeroom issues. Although the remark was a casual one with no thought of blaming anyone, the storekeeper, motivated by a feeling of responsibility, assumes the remark was meant as criticism for him. Many of us on entering a darkened room have perceived terrifying figures sitting on sofas or lurking behind curtains where actually there were none. These occur under the influence of fear motivation. In like manner our work-a-day communications are misinterperted under undue emotional influence. In our working relationships, we often find resistance to change motivated by feelings of insecurity. In each case the problem is solved best by patient skillful han-

dling. A frontal attack on a man's views hardens the individual and makes communication impossible. This should be avoided.

There are other factors that impede communications. In talking to an individual you may perceive that while he appears to be listening, actually he is not. He is impervious to the meaning of your words because his mind is wandering or he is using the time to muster arguments of his own in rebuttal. When we consider that 40 percent of communicating time is devoted to listening we realize the importance of learning to command attention.

Memory plays its part in distorting communications. A fact committed to memory is often repeated with a personal twist. Rumors and other grapevine material are classical examples of distortion in this manner. It is a known fact that the grapevine flourishes when formal communications are weakest. It serves to fill the void left by inadequate communications.

Media Rejection

People are inclined to evaluate media of information as a total whole and accept or reject the entire media without making specific judgment on individual items contained. Thus we find ourselves throwing away circulars we receive by mail with nothing more than a passing glance at them. Literature from pharmaceutical houses generally passes from the mail box to the waste basket because the physician considers it of low worth. When a form of communication becomes routinized and stereotyped, it ceases to attract attention and becomes worthless as information media. It is necessary to revamp our communication media frequently to revive interest. Media rejection applies to oral communication as well. How often have we hastened to avoid people who are conversational bores!

Aside from distortion, motivation, and psychological mechanisms of rejection, difficulties arise because individuals are continually making new adjustments to the environment by discarding what appears to be detrimental and adopting what seems to be beneficial. Acceptance of the new or different is on a provisional basis until tested and then possibly rejected. Thus the recipient is constantly shifting base and what were useful communication techniques and media suddenly become ineffective. When the boss lets it be known that his door is "always open," a trusting soul enters to bare his bosom, only to discover later that he wishes he had never entered. Our trusting friend has put the matter to test and found it lacking. The door remains open, but confidence has been destroyed and an important communication device is rendered useless.

Three Rules for Acceptance

Finally, certain rules tend to further acceptance of communication. Acceptance depends on a man's satisfaction of his needs. Direct orders may be carried out to be sure, but grudgingly so with high incident of accidents, loss of time, damage and other negative results. The first rule is to attune a communication to a listener's viewpoint of a situation, making our communication, whether it be an order or merely a suggestion for cooperation and understanding, as palatable and digestible as possible. Rather than primarily stressing content in our communications, it is wise to add those ingredients that will sway reader attitudes to empathize. This is particularly important when we direct our communications, written or oral, toward people of other departments whose agreement we will need to carry out our purpose.

Secondly, we should make it a point to transmit advice or information in small units in such a way that step by step acceptance can be accomplished. In so doing total rejection of ideas, projects, or whole mass of material is minimized and if rejection of components occurs, adjustments can be made. Cumulatively small units over a period of time will make a change acceptable whereas this could not be accomplished in one dose. Thirdly, to check for effect on the listener provides for "feedback." For example, in a discussion about the pharmacy committee as an effective medium for promoting the selection of drugs on the basis of usefulness, an intern remarks that the committee seems to prejudice a physician's prerogatives. A resident believes that the restricted drug policy is cumbersome and offensive. He says that except for dangerous and experimental drugs, control within the hospital is useless for inpatient medications are normally decided in conference, charts are reviewed at short intervals and rounds are made with chiefs or designates weekly. Further, the stop order commands review of the charts. However, the resident adds that restricted policies should be applied to outpatients where control of patient is lost once he leaves the clinic.

Such discussions measure the effectiveness of our communications and lead to changes which will improve acceptance, for through participation one identifies himself with, and becomes more readily responsive to the dictates of a group. The "feedback" is a constant index on the views of a participant and we may maneuver to prevent a crisis before it is too late.

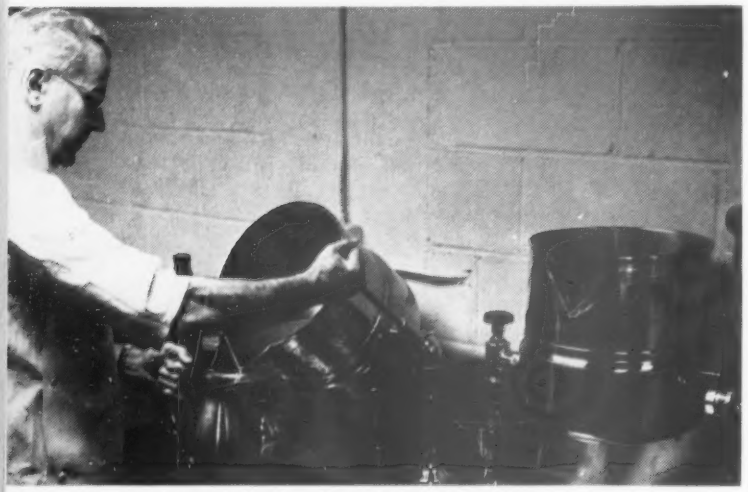
In this short discussion we have tried to focus on the recipient of a communication for what he feels and what he thinks affects the success of our efforts. Such considerations as mutual confidence, motivation, attitude, listening ability and understanding are as important, if not more so, than types of media employed in getting a message through. No complicated rules necessarily of limited scope, need be enumerated in summation. Only common sense and an understanding of the other fellow's viewpoint should be our guide.

1961 Annual Meeting
CHICAGO APRIL 23-28

► MEMBERS OF THE AMERICAN SOCIETY OF HOSPITAL PHARMACISTS attending the SOCIETY'S Eighteenth Annual Meeting in Chicago in April will participate in one of the outstanding programs of the decade. Meetings are scheduled throughout the week of April 23 in conjunction with the Convention of the American Pharmaceutical Association. The Sherman Hotel will serve as headquarters and announcements and details regarding the total A.Ph.A. meeting will be carried in a forthcoming issue of the *Journal of the American Pharmaceutical Association.*

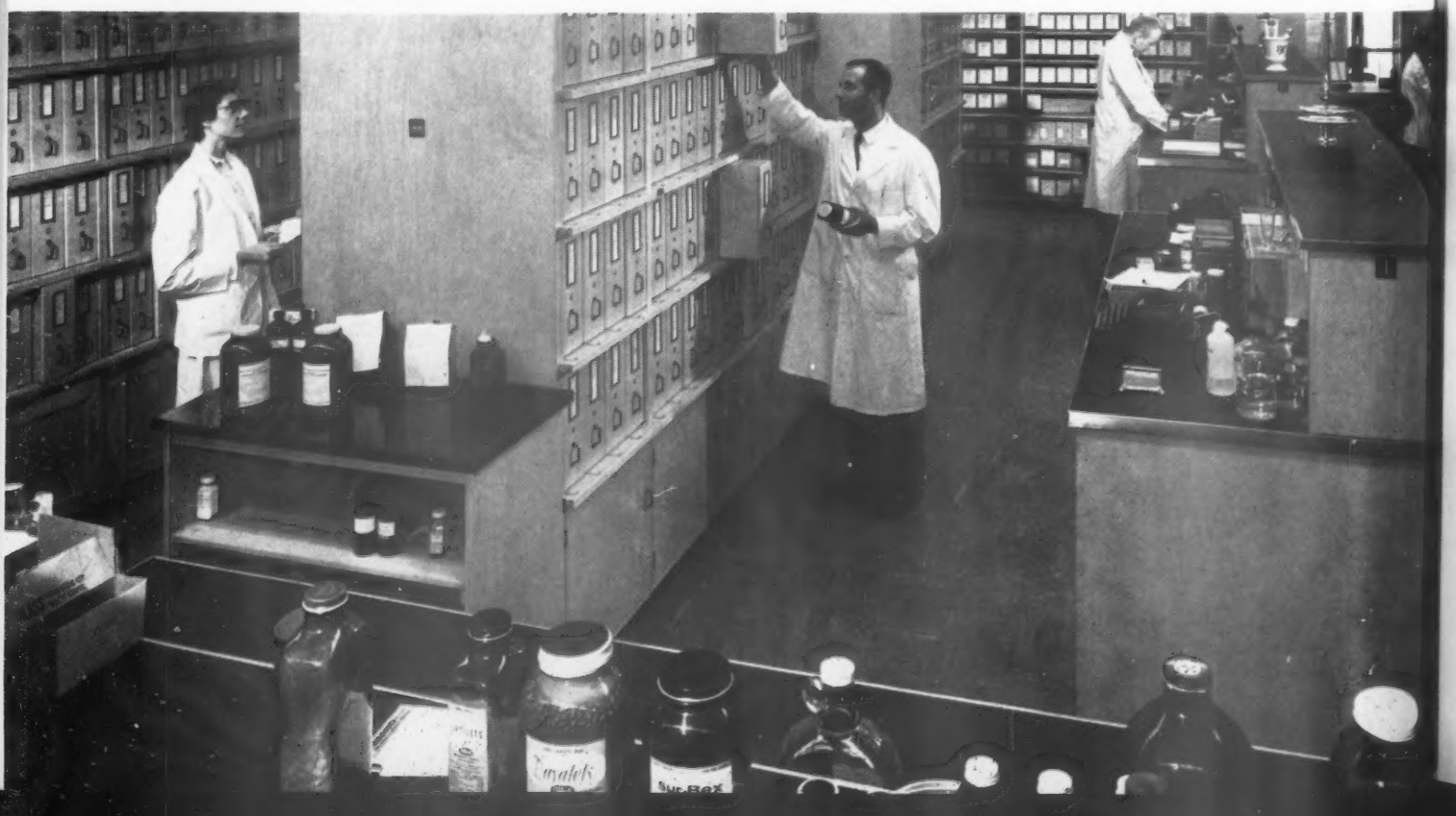
Heading the ASHP program will be a special guest from Denmark, Dr. Svend Aage Schou, a distinguished pharmacist, teacher, and research investigator. Dr. Schou comes at the invitation of the SOCIETY and brings a background of long experience and contributions to the profession. (See page 108.) Other outstanding speakers outside the ranks of our own membership include Mr. Ray E. Brown, superintendent at University of Chicago Clinics in Chicago. Mr. Brown has appeared on the ASHP program previously and is well known to hospital pharmacists for his work in the field of hospital administration, and as a past-president of both the American Hospital Association and the American College of Hospital Administrators. Also, Dr. Chauncey D. Leake, Assistant Dean at the College of Medicine, Ohio State University, Columbus, and a long time friend of hospital pharmacy, will speak on a subject of high interest. Dr. Robert P. Fischelis, former Secretary of the A.Ph.A. and one who has worked closely with hospital pharmacists, also has a place on the program.

Concluding a five year study on the Audit of Pharmaceutical Service in Hospitals, Don E. Francke will present a series of four reports, interpreting the results of the Survey. These studies cover nearly every phase of hospital pharmacy practice and will be



Manufacturing area at Presbyterian-St. Luke's Hospital, Chicago

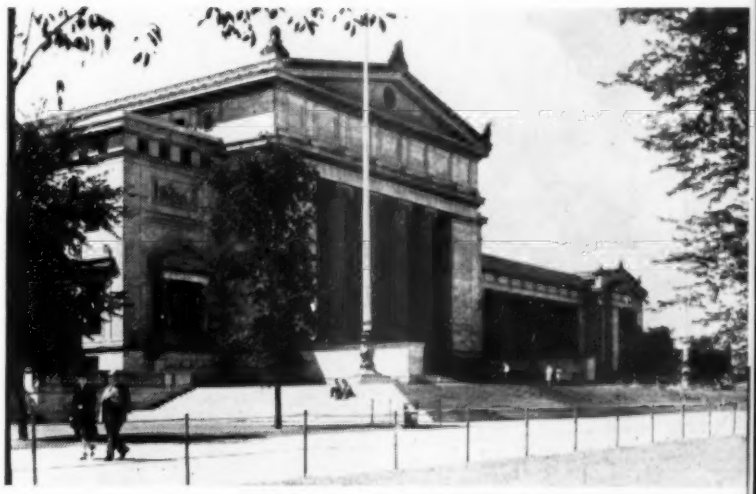
A scene from the dispensary at Chicago Wesley Memorial Hospital



Part of Chicago's Lake Michigan shoreline from the Planetarium

brought together along with numerous tables and graphs in a book entitled "Hospital Pharmacy at Mid-Century."

Other papers of high interest to the practicing hospital pharmacists will be presented and are listed in the complete program on the following pages. The program is in charge of the SOCIETY's Committee on Program and Public Relations headed by Paul F. Parker of the University of Kentucky Medical Center, Lexington. Other members of the Committee include Donald C. Brodie, San Francisco; Louis Gdalman, Chicago; F. Regis Kenna, Chicago; Kurt Kleinmann, Columbus, Ohio; and Fay Peck, Jr., Albany, N. Y.



Shedd Aquarium—said to be the largest institution of its kind in the world

The Food for Life exhibit at Chicago's Museum of Science and Industry

Business Sessions and House of Delegates

The 1961 ASHP Annual Meeting will be presided over by Clifton J. Latiolais of Columbus, Ohio. Other officers include Vice-President Peter Solyom, Chicago; Secretary Joseph A. Oddis, Washington, D. C.; and Treasurer Sister Mary Berenice, St. Louis, Mo.

The House of Delegates will hold one scheduled meeting and this will be on Sunday afternoon, April 23. Business sessions, along with the presentation of papers, will be held during four sessions throughout the week. These are scheduled for Monday afternoon, Tuesday morning, Tuesday afternoon, and Thursday morning. A.Ph.A. General Sessions, meetings of the House of Delegates, as well as the Section meetings and special events, will be held at various times throughout the week. In general there will be no conflict in A.Ph.A. general sessions and meetings of the A.Ph.A. House of Delegates with the ASHP sessions.

Also meeting during the week will be the ASHP's Executive Committee, the Committee on Resolutions and the Committee on Nominations. Reports from the various Officers and Committees will be presented at

the meeting of the House of Delegates on Sunday and at the First General Session on Monday.

For the information of members of the SOCIETY, the names of the members making up the Committee on Resolutions and the Committee on Nominations appear below:

Committee on Resolutions: Louis P. Jeffrey, *Chairman*, Albany Hospital, Albany, N. Y.; William H. Heller, Little Rock, Ark.; William E. Johnson, Kalamazoo, Mich.; Robert L. Ravin, Ann Arbor, Mich.; Sister M. Gonzales, Pittsburgh, Pa.; Theodore Taniguchi, Seattle, Wash.; and Gerard J. Wolf, Pittsburgh, Pa.

Committee on Nominations: Leo Godley, *Chairman*, Harris Hospital, Fort Worth, Tex.; Vernon O. Trygstad, Rockville, Md.; and Sister Mary Vera Rourke, Buffalo, N. Y.

ABOVE: *A view of the Pharmacy at Michael Reese Hospital in Chicago.*

BELOW: *The manufacturing laboratory, also at Michael Reese*

Members of the SOCIETY having communications which should be directed to either the Committee on Resolutions or the Committee on Nominations may send them to either the Secretary of the SOCIETY or to the Chairman of the Committee concerned.

Special Events

In addition to the professional program and the business sessions, highlights of the ASHP Annual Meeting include several special events in which all members are invited to participate. Opening these activities on Sunday immediately following the meeting of the House of Delegates will be a reception in honor of Dr. Svend Aage Schou, the SOCIETY's guest from Denmark.

On Tuesday night the SOCIETY will hold the annual H. A. K. Whitney Lecture Award Dinner. This year's recipient is Herbert L. Flack, Assistant Director, Jefferson Medical College Hospital, Philadelphia, Pa. Mr. Flack, a past-president of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, was formerly Director of Pharmacy Service at Jefferson Hospital. The award, made annually by the Michigan Society of Hospital Pharmacists, honors the first Chairman of the ASHP, Mr. Harvey A. K. Whitney. The Whitney Award Dinner will be preceded by a reception.

Closing the week's special events for hospital pharmacists will be the traditional Breakfast scheduled for Thursday morning. This event will be presided over by President-Elect Jack Heard.

Local Committee

Throughout the week a local committee headed by Edgar Duncan, U.S. Public Health Service Hospital, Chicago, will be of assistance to hospital pharmacists attending the meetings. Members from both the Illinois Society of Hospital Pharmacists and the Midwest Association of Sister Pharmacists make up the local committee including William R. Collins, University of Illinois Research and Educational Hospital, Chicago; Kate Mathews Whitfield, Provident Hospital, Chicago; Mary A. Petersen, Louis A. Weiss Memorial Hospital, Chicago; Daniel A. Ravegnani, Manteno State Hospital, Manteno, Ill.; James S. Palmgren, Northwestern University Medical School Clinic, Chicago; Sister Marie G. Fox, St. Joseph's Hospital, Chicago; and Sister Mary Kateri, St. Joseph Mercy Hospital, Aurora, Ill. William R. Collins and Edgar Duncan are also serving as members of the overall A.Ph.A. Convention Committee.

Numerous details and local arrangements will be handled by this Committee. The SOCIETY suite and a suite for ASHP Sister members will be available throughout the week. Members of the local committee will serve as hosts. Coffee will be available in the suites and it is hoped that SOCIETY members will take this opportunity for informal meetings with others attending the Annual Meeting.

Concluding the business of the Annual Meeting will be installation of officers at the Final Session on Thursday morning with the President's Inaugural Address immediately preceding adjournment. Officers to be installed for the 1961-1962 term include President Jack S. Heard of San Francisco, California, and Vice-President Gerard Wolf of Pittsburgh, Pennsylvania. The Secretary, Joseph A. Oddis, and the Treasurer, Sister Mary Berenice will continue in office as they have been elected for three-year terms.

Pharmacists Amelia Sikora and Nelson Kitsuse are shown as one of the 500 prescriptions filled daily is compounded at the Louis A. Weiss Memorial Hospital, Chicago. Shown below at the same hospital is a display case for drug products available from the various companies

Schedule of Meetings and Program

The following tentative schedule of all ASHP events will help hospital pharmacists attending the Annual Meeting in making plans.

SATURDAY

ASHP EXECUTIVE COMMITTEE

Saturday, April 22, 9:00 A.M.
Emerald Room—Hotel Sherman

SUNDAY

Sunday, April 23, 9:00 A.M.
Emerald Room—Hotel Sherman

ASHP COMMITTEE ON RESOLUTIONS

Sunday, April 23, 9:00 A.M.
Polo Room—Hotel Sherman

ASHP HOUSE OF DELEGATES

Sunday, April 23, 2:00 P.M.
Bal Tabarin Room— Hotel Sherman

1. Call to Order.
2. Welcome to Delegates and Members, Clifton J. Latiolais.
3. Minutes of Previous Meeting.
4. Roll Call of Delegates.
5. Introduction of Local Committee.
6. Introduction of Fraternal Delegates and Guests.
7. Appointment of Committees.
8. Preliminary Report of Committee on Resolutions, Louis P. Jeffrey, *Chairman.*
9. Preliminary Report of Committee on Nominations, Leo F. Godley, *Chairman.*
10. Recommendations from Officers, Committee Chairmen and Delegates.
11. Status of American Hospital Formulary Service, 1961, Dr. William M. Heller.
12. Report of Treasurer, Sister Mary Berenice.
13. Report of Executive Secretary, Joseph A. Oddis.
14. Pharmaceutical Service in Hospitals, Report of a Professional Audit:
    I. The Setting Within Which the Pharmacist Functions—The Hospital Complex; The Hospital Pharmacist as a Department Head; Physical Facilities; Personnel; Manpower Requirements, *Don E. Francke, Clifton J. Latiolais, Gloria N. Francke,* and *Norman F. H. Ho.*

RECEPTION FOR DR. SVEND AAGE SCHOU

Royal Danish School of Pharmacy
Copenhagen, Denmark
Sunday, April 23, 5:30 P.M.
Old Chicago Room—Hotel Sherman

MONDAY

ASHP COMMITTEE ON RESOLUTIONS

Monday, April 24, 9:00 A.M.
Polo Room—Hotel Sherman

FIRST SESSION

Monday, April 24, 1:30 P.M.
Bal Tabarin Room—Hotel Sherman

1. Call to Order.
2. Invocation.
3. Presentation of Awards.
4. Greetings from Allied Organizations:
   American Pharmaceutical Association.
   American Hospital Association.
   Catholic Hospital Association.
5. Minutes of Previous Meeting.
7. Resolutions and Communications.
8. Appointment of Committees.
9. Address of the President, Clifton J. Latiolais.
10. Our Professional Ethic, *Svend Aage Schou,* Royal Danish School of Pharmacy, Copenhagen, Denmark.
11. New Business.
12. Reports of Committee Chairmen.
13. Report from Division of Hospital Pharmacy, Joseph A. Oddis.

TUESDAY

SECOND SESSION

Tuesday, April 25, 9:00 A.M.
Bal Tabarin Room—Hotel Sherman

1. Call to Order.
2. Unfinished Business.
3. Pharmaceutical Service in Hospitals, Report of A Professional Audit:
   II. Professional Services of the Pharmacist—Scope of Pharmaceutical Services; Dispensing to Inpatients; Dispensing to Outpatients; Inspection of Drugs; Manufacturing or Bulk Compounding; Control Procedures; Role as Consultant; Teaching Activities; Investigations and Special Studies; Relationships with Medical and Nursing Staffs, *Don E. Francke, Clifton J. Latiolais, Gloria N. Francke, and Norman F. H. Ho.*
4. The Operation of an Assay and Control Division of a Hospital, *Svend Aage Schou,* Royal Danish School of Pharmacy, Copenhagen, Denmark.
5. Dynamics of Pharmacy and Hospitals, *Ray E. Brown,* Superintendent, University of Chicago Clinics, Chicago, Illinois.
6. Treatment of Hospital Equipment with Beta Propiolactone Vapor, *Samuel H. Hopper,* Chairman, Department of Public Health, Indiana University Medical Center, Indianapolis, Indiana.
7. Should the Pharmacist Assume Additional Responsibilities for Medication Preparations? *William M. Heller,* Chief, Pharmacy Service, University of Arkansas Medical Center, Little Rock, Arkansas.

► HOSPITAL PHARMACISTS attending the Annual Meeting will want to note in particular the changes in the scheduling. For complete details, follow the program starting on page 145. Of particular note is the change in the H. A. K. Whitney Award from Monday night to Tuesday night. Also, the President who takes office for the 1961-1962 term will present his address at the Final General Session. In previous years, this has been presented at a meeting of the House of Delegates rather than at a General Session.

THIRD SESSION

Tuesday, April 25, 1:30 P.M.
Bal Tabarin Room—Hotel Sherman

1. Call to Order.
2. Unfinished Business.
3. Pharmaceutical Service in Hospitals, Report of a Professional Audit:
   III. Administration Services of the Pharmacist - Administrative Responsibilities; Business Records; Purchasing; Expenditure for Drugs; Inventory of Drugs; Pharmacy Workloads, *Don E. Francke, Clifton J. Latiolais, Gloria N. Francke, and Norman F. H. Ho.*
4. The Economic Aspects of Drug Names, *Chauncey D. Leake,* Assistant Dean, College of Medicine, Ohio State University, Columbus, Ohio.
5. Public Interest in the Function and Practice of Pharmacy, *Robert P. Fischelis,* Pharmacy Consultant, Washington, D. C.
6. The Application of Data Processing Equipment to the Hospital Formulary, *Peter P. Lamy,* Pharmacist, Pharmacy Service, *Ivan F. Bourn,* Chief, Education and Research Division, Pharmacy Service, and *Herbert L. Flack,* Assistant Director, Jefferson Medical College Hospital, Philadelphia, Pennsylvania.
7. A Modified Medication and Graphic Sheet for Patients' Charts, *Leo F. Godley,* Chief Pharmacist, Harris Hospital, Fort Worth, Texas.
8. Unit-Dose Dispensing; Report of a Study, *Kenneth N. Barker,* Pharmacy Intern, *Warren E. McConnell,* Director of Pharmaceutical Services, University of Florida Teaching Hospital, and *Lillian Garrity,* Coordinator of Orientation and Inservice Training, Department of Nursing Services, College of Nursing, University of Florida, Gainesville, Florida.

H.A.K. WHITNEY AWARD DINNER

RECEPTION: Tuesday, April 25, 7:00 P.M.
Parlor, Bal Tabarin Room—Hotel Sherman
DINNER: Tuesday, April 25, 8:00 P.M.
Bal Tabarin Room—Hotel Sherman
1961 Recipient: Herbert L. Flack

WEDNESDAY

ASHP COMMITTEE ON RESOLUTIONS

Wednesday, April 26, 9:00 A.M.
Polo Room—Hotel Sherman

THURSDAY

ASHP BREAKFAST

Thursday, April 27, 8:00 A.M.
George Bernard Shaw Room—Hotel Sherman
PRESIDING: Jack S. Heard, President-Elect

FOURTH (FINAL) SESSION

Thursday, April 27, 9:30 A.M.
Bal Tabarin Room—Hotel Sherman

1. Call to Order.
2. Unfinished Business.
3. Pharmaceutical Service in Hospitals, Report of a Professional Audit:
   IV. Pharmacy and Therapeutics Committee; Education and Training; Professional Motivations and Professional Societies, *Don E. Francke, Clifton J. Latiolais, Gloria N. Francke, and Norman F. H. Ho.*
4. PANEL: Patterns for Professional Progress in Hospital Pharmacy.
   MODERATOR: Leo F. Godley, Harris Hospital, Fort Worth, Texas.
   PANELISTS: *Don E. Francke,* University Hospital, Ann Arbor, Michigan
   Svend Aage Schou, Royal Danish School of Pharmacy, Copenhagen, Denmark.
   William E. Johnson, Bronson Methodist Hospital, Kalamazoo, Michigan.
   Walter M. Frazier, Springfield City Hospital, Springfield, Ohio.
5. New Business.
6. Report of Committee on Resolutions.
7. Report of Committee on Nominations.
8. Installation of Officers.
9. Inaugural Address of the President.
10. Adjournment.

Overall A.Ph.A. Program

Hospital pharmacists attending the Annual Meeting are urged to take an active part in all meetings of the American Pharmaceutical Association. Announcements of the General Sessions, the meetings of the House of Delegates, and the Section meetings will appear in the A.Ph.A. *Journal.* A change in the total A.Ph.A. program includes the Final Banquet which will be held on Thursday night this year. The closing session of the A.Ph.A. will be held Friday morning so that the entire Convention will be over by noon.

Special events for women's entertainment as well as for all those attending the Convention will add to the business and professional meetings throughout the week.

Therapeutic Trends

edited by WILLIAM JOHNSON

Functional Menorrhagia—Treatment With Bioflavonoids And Vitamin C

Sixteen patients with functional menorrhagia were treated with citrus bioflavonoids and vitamin C. The average pre-treatment vitamin C level which was determined in 11 patients was above the average vitamin C level which indicated that in the large majority of instances, the capillary defect in menorrhagia was not the result of vitamin C deficiency. Cohen and Rubin report in *Current Therapeutic Research* 2:539 (Nov.) 1960 that fourteen of the patients who had excessive menstruation showed marked improvement which ranged from 50 to 100 percent. One patient with endometriosis and one who had pre-menstrual and post-menstrual staining showed no improvement. Duo-C.V.P. for this study was supplied by the U. S. Vitamin Company.

SYLVIA SCHMIDT

Pro-Nasyl For Sinusitis And Related Disorders

The use of Pro-Nasyl for local treatment was evaluated in a group of 241 otorhinological patients. Conditions treated included sinusitis, acute nasopharyngitis, catarrhal otitis media, allergic rhinitis, postnasal drip, nasal polyps, and Meniere's syndrome. This medication combines the prolonged bacteriostatic effect of o-iodobenzoic acid with the promptly effective osmotic hygroscopicity of triethanolamine with dibucaine in a special neutral hydrophilic base compounded from oleic acid, mineral oil and vegetable oil. Good or excellent results were obtained in 92 percent of all patients, with 90 percent for sinusitis and 94 percent for acute nasopharyngitis. Pro-Nasyl was well tolerated, non-irritating, promoted rapid healing, and tended to prevent reinfection of the mucous membrane of the nose and throat. Pro-Nasyl was described by H. Evans in *Eye, Ear, Nose, Throat Monthly* 39:968 (Dec.) 1960 and supplied for this study by the Progonasyl Company.

SYLVIA SCHMIDT

Clinical Evaluation Of Methindethyrium Chloride In Hypertension

Clinical evaluation of an asymetric, bisquaternary ammonium salt has been reported by Smith *et al.*, in *Antibiot. Med. & Clin. Ther.* 7:605 (Oct.) 1960. This compound was found to possess experimental evidence of central hypotensive activity. Methindethyrium chloride is poorly absorbed from the gastrointestinal tract and therefore has little or no hypotensive activity when administered unless intestinal absorption can be enhanced. Addition of the compound, IN-414, to the methindethyrium chloride was found to increase the hypotensive activity so that it approached that obtained by parenteral administration. The hypotensive effect of this drug was also found to be enhanced slightly by its administration in conjunction with reserpine and cryptenamine. Methindethyrium chloride was supplied by Irwin Neisler Research Laboratories.

KENNETH W. HUCKENDUBLER

A New Synthetic Analgesic—Dextromoramide

The clinical study of 102 patients involving the use of dextromoramide [d-1-(3-methyl-4-morpholino-2,2 dephenylbutyryd) pyrrolidine tartrate] was reported by A. Lewis Kolodny in *Antibiotic Med. & Clin. Therapy* 7:695 (Nov.) 1960. Patients with both chronic and acute pain of various etiologies were used in the study. Eighty-six percent of the patients received excellent results, 77 percent receiving complete relief with no side effects. Side effects were transient and usually disappeared as therapy was continued. It was found that the drug has the particular advantage of being equally effective, both orally and parenterally. The study indicated no development of tolerance or addiction to the drug after prolonged treatment. Onset of action after oral administration was ten to twenty-five minutes with a duration of four to six hours. In a study by Janssen and Jageneau it was found that the drug is fifteen times as potent in rats as methadone, thirty times as potent as morphine, and one-hundred time as potent as meperidine. The duration of analgesia was the same for all four drugs, but dextromoramide had the fastest onset of action. Considering the advantages of this drug, it should prove to be an outstanding and superior addition to the analgesic agents now available. The drug was supplied by the G. F. Harvey Company under the trade name of Palfium.

WILLIAM C. THAYER

Consulting WITH BOWLES

GROVER C. BOWLES JR., *Baptist Memorial Hospital, Memphis, Tennessee*

► What can be done to provide adequate pharmaceutical service to those hospitals which cannot justify the services of a full-time pharmacist?

Ideally, those hospitals that cannot justify the services of a full-time pharmacist would share a pharmacist with another hospital in the community. If there is no other hospital within a reasonable distance, perhaps arrangements can be made with a local retail pharmacist to provide pharmaceutical services and serve as a consultant to the administrator, medical staff and nursing staff on pharmaceutical matters. Small hospitals are finding it advantageous to combine duties such as central supply supervision, purchasing, assistant to the administrator and other duties with pharmacy in order to justify a pharmacist on their full-time staff.

► What is a stat order?

Stat is the abbreviation for *statim* which means immediately. Thus a stat order is one which should be filled immediately.

► Please suggest one or two good references dealing with poisons for use in a hospital pharmacy not connected with a poison control center

I think every hospital pharmacy should have a copy of the following textbooks dealing with the treatment of poisonings: (1) Clinical Toxicology of Commercial Products, Gleason Gosselin, and Hodge, Williams and Wilkins Company, Baltimore, Maryland. (2) Handbook of Poisons, Dreisbach Lange Medical Publications, Los Altos, California. (3) Clinical Memoranda on Economic Poisons, Clinical Development Laboratories, Clinical Disease Center, U. S. Public Health Service, Savannah, Georgia.

You will also find the A. Ph. A. Manual Number 101, Suggested Antidotes and the section on poisons and antidotes in the current Physician's Desk Reference helpful.

► What constitutes emergency drugs and what provisions should be made for their availability on nursing stations?

The term emergency drugs should be restricted to those drugs that are apt to be needed at once in order to prevent discomfort, damage or death to a patient. Included would be such drugs as the cardiac and respiratory stimulants, rapidly acting barbiturates for the control of convulsions, antidotes for overdosage of narcotics and vitamin K for overdosage of anticoagulants.

Most hospitals have some type of emergency drug box at each nursing station. Frequently, this is a small metal cash box. In addition to the drugs, the box should contain a tourniquet and hypodermic syringes with needles.

The pharmacist should seek the help of the Pharmacy and Therapeutics Committee in compiling a list of emergency drugs to be stocked at the nursing station. Of course, the nursing service should also participate in the selection of emergency drugs.

► Should the patient be permitted to take any unused medication home with him?

This decision rests with the patient's physician. If the physician wants the patient to continue to take the medication, there is no reason why the patient should not take any unused portion home at the time of discharge. However, the unused medication should be sent to the pharmacy for proper labeling prior to discharge.

► Who should determine what disposable items, such as syringes, needles, catheters, enema tubes, etc. will be used in the hospital?

Many disposable items for hospital use are now available. Some are highly desirable from a patient care point of view but are too costly for general use. Not infrequently, claims regarding the economies involved in the use of a particular item are exaggerated. For this reason, many hospitals now have product evaluation committees to assist in the evaluation and selection of disposable products. The committee is especially helpful when the product concerned is used by more than one department, such as disposable hypodermic syringes and needles. Usually the committee is composed of the purchasing agent, pharmacist, director of nurses, central supply supervisor, other key department heads and a representative of the administration.

► Could you suggest a method of inciting interest in hospital pharmacy among pharmacy students?

Perhaps the most effective method of encouraging the interest of pharmacy students in hospital pharmacy is to provide part-time jobs for as many students as possible in hospitals during the summer months. Second best, is to arrange for tours of well run hospital pharmacies for students in their junior and senior year. Of course, there is no substitute for well informed faculty members who are always in a good position to encourage students to pursue hospital pharmacy as a career.

CONTROL OF POISONINGS

edited by **ALBERT L. PICCHIONI,** *Director, Arizona Poisoning Control Program*

Toxicity of Antifreeze

► IN VIEW OF THE SUBFREEZING TEMPERATURE which prevails in various parts of Arizona, it appears timely to acquaint physicians in our state with the toxicological hazards of antifreeze preparations commonly employed in automobile radiators. The so-called "permanent" antifreeze usually contains 90-100 percent ethylene glycol, a dye, and a rust inhibitor.[1] Ethylene glycol is the major toxic ingredient in this type of preparation. Another type of antifreeze ("non-permanent") usually contains methyl alcohol, a dye, and a rust inhibitor.[1] Methyl alcohol constitutes the major toxic ingredient in the latter type of antifreeze.

The oral lethal dose of ethylene glycol for adults appears to lie between 3 and 4 ounces,[1,2,3] although survival after the ingestion of 8 ounces has been reported.[4] Ethylene glycol is a central nervous system depressant and kidney poison; the symptoms and treatment of intoxication caused by this chemical are well described in various publications.[1,2,4,5,6,7] Following the ingestion of ethylene glycol, there is an initial transient period of exhilaration followed by the development of ataxia, stupor, and coma, with or without an intermediary stage of convulsions. There may be nausea, vomiting (sometimes hematemesis), and abdominal cramps. The respiration may be noisy and shallow and slow or rapid. The effect of ethylene glycol on the kidneys results in acute renal failure with oliguria or anuria, uremia, hematuria, electrolyte changes, acidosis, peripheral edema, ascites, and pulmonary edema. Death may occur as the result of respiratory paralysis or as the result of renal failure, usually the latter.

Treatment of ethylene glycol poisoning is mainly symptomatic. The ingested poison should be promptly evacuated from the stomach by induced emesis or gastric lavage with a 1:5,000 potassium permanganate solution. The respiration should be supported by the administration of oxygen and artificial respiration. The administration of fluid and electrolytes should be limited to replacement of the amount lost in the urine, perspiration, vomiting, etc. Use of the artificial kidney should be considered for the management of renal failure, hyperpotassemia or intractable acidosis. The seriousness of poisoning from the ingestion of "permanent" antifreeze was recently emphasized by Haggerty.[7] This physician reported an incident in which a group of youth mistakenly consumed some "permanent" antifreeze which was stored in a whiskey bottle. The next morning a 16-year-old boy and a 17-year-old girl were hospitalized and treated for acute renal failure with the artificial kidney. Unfortunately, the girl died in severe, uncontrollable metabolic acidosis after treatment and the boy died later of irreversible renal damage.

The oral lethal dose of methyl alcohol in man lies between 2 and 8 ounces.[8] The well-known symptomology and treatment of methyl alcohol poisoning may be found in various textbooks of pharmacology and toxicology.[3,8,9] Poisoning due to this alcohol results from a combination of factors, consisting of (1) a minor component of central nervous system depression, (2) a major component of acidosis due to formic acid, and (3) a specific toxicity of the metabolic products of methyl alcohol (probably formic acid) for the retinal cells. An asymptomatic latent period of 8 to 36 hours may precede the onset of symptoms. Survival and salvage of vision is directly dependent on rapid and complete restoration of acid-base balance. Acidosis should be treated with alkalis, administered in amounts and by routes determined by the severity and progress of the case. Since the oxidation of methyl alcohol is slow, there is a likelihood of recurrence of acidosis after a period of successful treatment. Hence it is recommended that close observation and proper therapy should be continued for several days. As an adjunct, whiskey (or 50 percent ethanol in water), 1 ounce every 3 or 4 hours, may be given by mouth or stomach tube to retard oxidation of the methyl alcohol. The combined use of alkali and whiskey in the successful treatment of 26 Navy men who ingested pure methyl alcohol, varying between 3 and 8 ounces, has been reported by Chew and associates.[10]

Chronic Carbon Monoxide Poisoning

► ALTHOUGH THE ACUTE FORM OF CARBON MONOXIDE poisoning is well recognized, the chronic form of carbon monoxide poisoning has not been fully appreciated. It has been suggested that chronic carbon monoxide intoxication, if such occurs, is the result of repeated acute exposures and that a chronic illness develops from the cumulative effects of repeated tissue injury due to intermittent exposure to the gas.[1] However, Gilbert and Glaser recently cited a case of carbon mon-

oxide poisoning and pointed out the possibility that chronic poisoning by the gas represents a true chronic intoxication rather than one of repeated acute insults.[2]

The case history reported by Gilbert and Glaser[2] involved a policeman, who had spells of dizziness, somnolence, and unconsciousness while directing heavy traffic. In addition the patient had undergone marked personality changes and had become highly nervous and irritable. He also experienced an increase in fatigability, tremor, and sweating. General physical and neurologic examinations revealed no abnormal findings except for mental dullness, general hyperactivity and impaired concentration. The patient was hospitalized and his condition improved. He was discharged with a diagnosis of psychomotor seizures and cerebral atrophy and was placed on antiepileptic medication. A few months later, after he had returned to work, his condition worsened. He had obtained a transfer and worked in the police garage where automobile motors were frequently left running while the radios were adjusted. During the second examination a detailed occupational history was obtained and a blood sample, taken 30 hours after the final exposure to working environment, was examined for carbon monoxide. The specimen was found to be 20 percent saturated with carbon monoxide. The anticonvulsant medication was discontinued and within a week of hospitalization, the patient's condition improved; his personality and behavior became normal. After discharge the patient continued to be asymptomatic, except for one weekend when he experienced transient episodes of staggering, confusion, and irritability. These attacks were associated with the operation of a farm tractor, which required the patient to walk behind the machine. The patient stopped working with his tractor and has remained essentially symptom-free.

This case report serves to emphasize the difficulty which may be encountered in the diagnosis of chronic carbon monoxide intoxication. It is suggested that the occupational or environmental history be carefully considered in cases which involve symptoms such as intermittent unconsciousness, anorexia, nausea, weight loss, apathy, fatigability, headache, dizziness, insomnia, and personality changes. Cases of suspected carbon monoxide poisoning may readily be confirmed by a blood test, made shortly after exposure to the offending environment.

References

1. Gleason, M. N., Gosselin, R. E., and Hodge, H. S.: *Clinical Toxicology of Commercial Products,* Williams and Wilkins, Baltimore, 1957, p. 142.
2. Locket, S.: *Clinical Toxicology,* The C. V. Mosby Company, St. Louis, 1957, p. 309.
3. Hulpieu, H. R. and Harger, R. N.: The Alcohols, in: *Pharmacology in Medicine* by Drill, V. A., Ed., McGraw-Hill Book Company, Inc., New York, 1958, p. 195.
4. Kahn, H. S. and Brotchner, R. J.: A. Recovery from Ethylene Glycol (Antifreeze) Intoxication; a Case of Survival and Two Fatalities from Ethylene Glycol Including Autopsy Findings, *Ann. Intern. Med., 32*:284, 1950.
5. von Oettingen, W. F.: *Poisoning,* W. B. Saunders Company, Philadelphia, 1958, p. 357.
6. Flint, Jr., T.: *Emergency Treatment and Management,* W. B. Saunders Company, Philadelphia, 1958, p. 254.
7. Haggerty, R. J., Deaths from Permanent Antifreeze Ingestion, *New Engl. J. Med., 261*:1296, 1959.
8. Gleason, M. N., Gosselin, R. E., and Hodge, H. C., *Clinical Toxicology of Commercial Products,* Williams and Wilkins, Baltimore, 1957, p. 155.
9. *Ibid.* p. 114.
10. Chew, W. B., Berger, E. H., Brines, O. A., and Capron, M. J.: Alkali Treatment of Methyl Alcohol Poisoning, *J.A.M.A., 130*:61, 1946.
11. Goodman, L. S. and Gilman, A.: *The Pharmacological Basis of Therapeutics,* 2nd edition, the Macmillan Company, New York, 1956, p. 929.
12. Gilbert, G. J. and Glaser, G. H.: Neurologic Manifestations of Chronic Carbon Monoxide Poisoning, *New Engl. J. Med., 261*:1217, 1959.

Hypotension - A Major Toxic Symptom of Meprobamate Poisoning

► IN A RECENT MEDICAL PUBLICATION Ferguson and co-workers[1] reported on the treatment of 5 would-be suicides who ingested large doses of meprobamate (Miltown, Equanil). One of the patients consumed 16 grams (40 tablets) of the drug, 3 patients took somewhat smaller quantities and the remaining patient refused to divulge the amount of drug she had taken. The typical features of meprobamate poisoning reported by these clinicians are severe hypotension, responsiveness to painful stimuli, and presence of deep tendon reflexes and respiratory function. These findings are different from those observed in barbiturate poisoning, where response to painful stimuli and deep tendon reflexes disappears long before there is cardiovascular collapse, and respiratory depression occurs before or concomitantly with the development of hypotension.

Since the degree of hypotension in meprobamate poisoning is greatly out of proportion to central nervous system depression, the authors considered maintenance of the blood pressure as the major therapeutic challenge. They recommended the use of vasopressor agents, *e.g.* metaraminol bitartrate (Aramine) and phenylephrine (Neo-Synephrine) hydrochloride, for treating meprobamate-poisoned patients whose systolic pressure falls below 90 mm. of mercury. Because of the insidious nature of meprobamate-induced hypotension (1 patient showed evidence of hypotension 1 hour after admission whereas another had hypotension 9 hours after admission), Ferguson and co-workers emphasized the need for frequent and careful recording of vital signs. They further suggested that a vein be kept open until the patient is fully conscious. Analeptics were not employed in the 5 cases treated and, furthermore, were not recommended by the authors.

Reference

1. Ferguson, M. J., Germanos, S., and Grace, W. J.: Meprobamate Overdosage: A Report on the Management of Five Cases, *Arch. Int. Med., 106*:237 (Aug.) 1960.

F.D.A. Commissioner George Larrick speaks at the Pan-American Congress

PAN-AMERICAN CONGRESS

Santiago, Chile

► THE AMERICAN SOCIETY OF HOSPITAL PHARMACISTS was represented at the Fifth Pan-American Congress of Pharmacy and Biochemistry with President Clifton Latiolais heading the U. S. delegates in the Section on Hospital Pharmacy. A brief account of the meeting, along with the names of hospital pharmacists who participated, is covered in "As The President See It" appearing on the following page.

The Congress was held in Santiago, Chile on November 12-19 with approximately 1200 delegates representing all of the Pan-American countries. Special credit is given the pharmacists of Chile who did an outstanding job in organizing the Congress and entertaining the delegates.

Approximately 40 delegates from the United States participated in the various Sections of the Congress. Louis J. Fischl, a past-president of the American Pharmaceutical Association was elected to serve as head of the delegation. Mr. Fischl was also elected as one of the vice-presidents of the Congress. Victor M. Cereceda, chairman of the Organizing Committee for the Congress was elected president. He was also named president of the Pan-American Pharmaceutical and Biochemical Federation succeeding Dean Joseph B. Burt who was elected at the Fourth Pan-American Congress held in Washington, D. C. in 1957.

A number of pharmacists from the United States actively participated in the meetings with the presentation of papers and election to offices in the various Sections.

► THIS ENUMERATION of the activities of the international organizations explains how great and profound our social role is. As it is essentially dynamic (let us recall what has happened in the field of therapeutics in the last 25 years), it influences and is influenced by the evolution of the societies. For this reason, we hope that as a result of your deliberations, the efforts of pharmacists and biochemists will be renewed to respond to the need of the Americas asking for economical development in accord with social progress, which will produce welfare compatible with human dignity. This is the moral responsibility of all the intellectuals of the hemisphere. Otherwise, we shall be in the sad conditions described by the poet:

Left behind, without hope of return,
having abandoned ourselves.

From Address prepared by Dr. Abraham Horwitz, Director of the Pan-American Sanitary Bureau on the occasion of the Inaugural Session of the Fifth Pan-American Congress of Pharmacy and Biochemistry, Santiago, Chile, 1960.

Among speakers from the United States at the general sessions were George P. Larrick of the Food and Drug Administration who spoke on "The Control of Drugs in the United States;" Dr. Lloyd Miller, Chairman of the U.S.P. Revision Committee, who discussed "National and International Pharmacopoeias;" and Mr. Louis J. Fischl presented a paper for A.Ph.A. Secretary William S. Apple on "Pharmacy's Potential in International Cooperation."

A number of resolutions were passed by the Congress and these are presented on page 6 of the January issue of the *Journal of the American Pharmaceutical Association*. Of particular note to hospital pharmacists is one which calls for the formation of an association of hospital pharmacists in each of the countries of the Americas where they do not exist.

Hospital Pharmacy Section

Highlights of the Hospital Pharmacy Section included presentation of the following papers by hospital pharmacists from the various Pan-American countries:

"Handling of Prescriptions," by Elena Ramierz and Heriberto Contreras.

"Professional Activities of the Hospital Pharmacist," by Juana Leixelard Lacoste and Marta de la Rivera Bahamondes.

"Organization and Control of the Sterile Room," by Natalia Toro and Aida Carbone and Auristela Sepúlevda.

"Statistics," by Blanca Vera Elgueta and Graciela Lacoste N.

"Requisitions," by Marta de la Rivera and Juana Leixelard.

"Pharmacist Personnel in the National Health Service," by Ricardo Valenzuela and Julio Sanchez.

"Employment Systems in the National Health Service," by Luis Alvarado Moscoso.

"Manufacturing in Hospital Pharmacy," by Ermilcia Rodriguez R. and Ninfa Chiang.

"Solutions for Parenteral Administration," by Ana Zuñiga and Eugenia Molina.

"Physical Plant," by Raquel González and Juana Leixelard.

To the extent possible abstracts of the above papers will appear in a future issue of THE JOURNAL.

The Chairman of the Hospital Pharmacy Section was Mr. Josea Carvaja of the Republic of Panama. Dr. Juana Leixelard, chief pharmacist, Roberto Del Rio Hospital, Santiago, served as secretary of the Section. Dr. Leixelard is also the vice-president of the Federacion de Farmaceuticos Funcionarios of Chile.

Future Meetings

Plans were made to hold the next Pan-American Congress on Pharmacy and Biochemistry in Mexico City in 1963. Dr. Victor Cereceda was elected president of the Federation for the next Congress.

► ON STUDYING THE AGENDA of the Fifth Pan-American Congress of Pharmacy and Biochemistry that is being inaugurated today, one sees ideas that move around exclusive though very closely related levels. They could be classified both in the origin of life and in the conscience of men. In no other way may we interpret the papers on biochemistry and those of essentially moral order that are related with therapeutical advancement and the possibilities of reaching with new medicines—tested as scientifically efficient—those persons that really need them.

This is because your scope of action is very broad. The professions that it includes are connected to the studies on the joint transformation of matter and energy and are projected until they penetrate deeply into the life of the community. Its ultimate purpose is to guarantee health and to contribute to the welfare of the people, thereby reflecting the deep social content of the different disciplines comprised.

Man is the objective, the measure, and the end of all things. To him are directed our efforts and therefore the ideas that will be exposed and the experiences that will be analysed in this Congress.

From Address prepared by Dr. Abraham Horwitz, Director of the Pan-American Sanitary Bureau on the occasion of the Inaugural Session of the Fifth Pan-American Congress of Pharmacy and Biochemistry, Santiago, Chile, 1960.

as the president sees it—

CLIFTON J. LATIOLAIS, *Ohio State University Health Center, Columbus, Ohio*

►DELEGATES AND GUESTS from North, Central and South America attended the Fifth Pan-American Congress on Pharmacy and Biochemistry which was held in Santiago, Chile, S.A. on November 12-19, 1960. Mr. John Gooch, V.A. Central Office, Washington, D.C., Miss Nellie Nigro, U.C.L.A. Medical Center, Los Angeles, Mrs. Ethel Pierce, N. Abington, Mass. and I were among the United States delegation attending the Congress.

As with any successful venture, there can usually be attributed some unusual and significant contributing factor. In this case, members of the Chilean Pharmaceutical Association made a financial contribution for two years through a monthly assessment above and beyond their regular membership dues in order to provide sufficient funds to plan and organize an outstanding program for the delegates and guests attending the Congress in their host country. Such dedication on the part of these Chilean pharmacists commands the highest praise and thankful recognition from their colleagues of the western hemisphere.

Under the direction of Dr. Juana Leixelard, chief pharmacist of the Roberto Del Rio Hospital of Santiago, the hospital pharmacy section of the Congress was well organized, well attended and provided a good atmosphere for an inter-change of professional information about hospital pharmacy in the different countries represented. Out of the ten separate sections, hospital pharmacy was the only section in which all the papers were duplicated and made available to the delegates in attendance.

In the United States, hospital pharmacists have been (on numerous occasions) singled out within the profession for their enthusiasm, their dedication, and their perserverance toward improving their professional capabilities. In this regard, we are not unique, for hospital pharmacists practicing in the other countries of North, Central and South America are equally as dedicated in their professional motivations. Their quest for additional information on all matters pertaining to hospital pharmacy is only one indication of their interest.

Our Latin colleagues were highly complimentary of our hospital pharmacy literature, that is, our outstanding AMERICAN JOURNAL OF HOSPITAL PHARMACY. A specific suggestion was made regarding a means of facilitating an interchange of professional information. The suggestion was that the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS consider the possibility of translating some of its major documents into Spanish and make them available to hospital pharmacists in the Spanish speaking Latin American countries. Regarding such major documents these hospital pharmacists referred primarily to the *Minimum Standard for Pharmacies in Hospitals,* and the *Minimum Standard for Pharmacy Internship in Hospitals.* Such a suggestion might well be considered by the SOCIETY prior to the next Pan-American Congress which will be held in Mexico City in 1963.

Among the many tours scheduled during the Congress was one of special interest to the hospital pharmacists. This was a tour of the pharmacy department at the José Joaquin Aquirre Hospital (1000 beds) which is affiliated with the University of Chile in Santiago. The pharmacy department includes the central sterile supply service and also maintains procurement and distribution control of all hospital surgical supplies, instruments, etc., as well as all chemicals, stains and reagents, utilized by the hospital diagnostic and clinical laboratories. The department maintains an extensive manufacturing program including preparation of parenteral solutions. Drugs are dispensed on an individual dose basis for hospitalized patients, and pharmacy services are available to the outpatients.

It was also interesting to note that all the retail pharmacies in Chile are concerned primarily with the basic function of pharmacy to the public. The wide variety of non-drug merchandise carried in American drug stores is not present in Chilean pharmacies. In fact, their federal regulations limit pharmacies to the provision of drugs and ancillary health care needs. Although many individuals feel that perhaps pharmacy in many of these countries may not be as "advanced" as American pharmacy, they have still maintained some of the professional heritage of European pharmacy which we in America wish that our forebears should have maintained.

Clifton J. Latiolais

A A A S

American Association for the Advancement of Science

—Pharmacy Section, New York City

► HOSPITAL PHARMACY was well represented at the Pharmacy Section (Np) of the Annual Meeting of the American Association for the Advancement of Science held in New York City, November 27 through 31. Also, election of Mr. Joseph A. Oddis, Secretary of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, Washington, D. C., as a Vice-President of the Association and Chairman of the Section for the coming year, signifies active participation by hospital pharmacists. Mr. Oddis will preside at the Denver, Colorado meeting in December 1961. Also, the Section elected Lee H. MacDonald of the Product Research and Development Department, the Upjohn Company, Kalamazoo, Michigan, to serve on the Committee-at-Large of the Section for a four-year term. In addition to the above, those serving on the Committee-at-Large include John Christian who continues to serve as Secretary of the Section, Lafayette, Indiana; Joseph V. Swintosky, Philadelphia, Pennsylvania; George Archambault, Washington, D.C.; Don Francke, Ann Arbor, Michigan; and John Autian, Austin, Texas. Mr. Joseph Oddis currently serves as the ASHP representative to the Section Committee and Council.

Of major interest to the group in attendance was a stimulating vice-presidential address entitled "Dedication to Pharmacy," presented by Dr. Joseph V. Swintosky.

Symposium on Safe Use of Cosmetics

A symposium entitled "The Scientist's Contribution to the Safe Use of Cosmetics" also attracted considerable interest, not only on the part of the pharmaceutical scientists in attendance, but also by many individuals from other scientific disciplines and cosmetic scientists located in the New York area. Over 300 persons attended each of the two sessions held on the subject.

Dr. Marion B. Salzberger, Department of Dermatology at New York University, gave introductory remarks, served as presiding officer and as moderator of the discussion periods at both sessions. Dr. William Montagna, Department of Biology at Brown University, gave a discussion of some of the problems of biological research and their relation to cosmetic development and use and Kenneth M. Wilson of the U. S. Army Chemical Research and Development Laboratories, Army Chemical Center, discussed new methods for the study of percutaneous absorption. He emphasized the importance of the use of radioactive isotopes for such studies and showed a British film which described such a technique for use in *in vivo* human skin penetration studies. Dr. William F. Bousquet, Purdue University, spoke on the use of radioactive isotopes in cosmetic research and also emphasized the importance and versatility of radioisotope techniques in studying cosmetic problems and safety. A number of demonstrations were presented and examples of application were cited. The role of dermatologic research in cosmetic formulation was covered by Allan L. Lorincz of the Section of Dermatology at the University of Chicago. Dr. Glen J. Sperandio, Purdue University, discussed the science of safe cosmetic formulation. He listed eight main factors contributing to cosmetic safety and emphasized that these must be coordinated by the cosmetic scientist to create safe products. He predicted an increasing number of therapeutic cosmetics, a new branch of geriatric cosmetics and increased utilization of cosmetics by the male. Following the above papers an hour-long question and discussion period resulted.

The second session of the symposium was initiated with a discussion of skin reactions due to cosmetics by Dr. Howard T. Behrman, of New York Medical College. He delineated the types of reactions, the frequency of their occurrence, the causal mechanisms, clinical features, and the therapy of these skin manifestations. Methods of appraisal for the potential hazards of cosmetics were set forth by Dr. Adolph Rostenberg, Jr. of the Department of Dermatology, University of Illinois. He emphasized the various techniques for predicting the development of allergic sensitizations. The cosmetic industry's interest and responsibility in cosmetic safety was discussed by Williard M. Bright, Lever Brothers Company, Edgewater, N. Y.; Dr. Irvin Kerlan of the Bureau of Medicine, Food and Drug Administration, Washington, D. C., explored the government's role in the control of cosmetics. He pointed out that federal control of cosmetics under the Federal Food, Drug and Cosmetic Act serves to provide safe, truthfully and informatively labeled and unadulterated products. The symposium was terminated with a question and answer session on current cosmetic problems.

Hospital Pharmacy Section

A one day program, under the sponsorship of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, was devoted to hospital pharmacy. This included a number

of outstanding contributed papers on the scientific and professional aspects of hospital pharmacy practice. The Section was under the guidance of George F. Archambault and Joseph A. Oddis. With approximately 70 hospital pharmacists in attendance, the following groups were represented: AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, American Pharmaceutical Association, New York State Council of Hospital Pharmacists, American Hospital Association, and the American Association of Colleges of Pharmacy. Luncheon, entertainment, and dinner were sponsored by E. R. Squibb and Sons, Wyeth Laboratories, and McKesson and Robbins, Inc., respectively.

Papers presented in the hospital pharmacy session were of wide interest and stimulated considerable discussion. Among subjects covered were the following: "A Comparative Study of Disposable Versus Reusable Surgeon's Gloves in the Operating Room," by Mildred Struve, U. S. Public Health Service Hospital, Boston; "The Scientific Tradition in French Hospital Pharmacy," by Alex Berman, University of Michigan College of Pharmacy, Ann Arbor; "A Review of Pharmacy and Therapeutics Committee Regulations," by Benjamin Chiazza and Herbert L. Flack, Jefferson Medical College Hospital, Philadelphia; Drug-Plastic Interaction, by John Autian, the University of Texas, Austin; Specialty Pharmaceutical Dosage Forms, by Arnold C. Neva, Duquesne University, Pittsburgh; The Pharmacist's Growing Responsibility in the Care of Nursing Home Patients, by Kenneth R. Nelson, Jr., U. S. Public Health Service, Washington, D. C.; Providing Pharmacy Service to a Small Hospital by a Larger Hospital, by Edgar N. Duncan, U. S. Public Health Service Hospital, Chicago and Gabriel P. Ferrazzano, U.S. Public Health Service, Washington, D.C.; Practical Applications of Quality Control, by Louis P. Jeffrey, Albany Hospital, Albany, N.Y.; Planning of a Sterile Technics Laboratory, by Niel Davis, Herbert L. Flack, and Kenneth Avis, Jefferson Medical College Hospital, Philadelphia; The Release of Antiseptics From Lantrol-Containing Ointment Bases, by Charles H. Nesbit, Jr., V. A. Center, Fargo, N. D.; Will Automation Replace the Hospital Pharmacist, by Alfred A. Mannino, Geigy Pharmaceuticals, Yonkers, N.Y.; The Brewer System, by Thomas A. Manzelli, The Lankenau Hospital, Philadelphia; and Wound Healing May Be Aided by the Use of Fewer Gauze Sponges and Maintaining Sterility of Gauze Dressings by Proper Packaging, by Sister Mary John, Mercy Hospital, Toledo, Ohio.

To the extent possible, these papers or abstracts of them will appear in a forthcoming issue of THIS JOURNAL.

Contributed Papers

Professor John Autian, College of Pharmacy, University of Texas, opened the first contributed paper session which consisted of the presentation of the results of original scientific investigations. Norman J. Doorenbos and co-workers at the University of Maryland presented a series of six papers describing work recently completed on the synthesis of aza steroids. C. E. Breckinridge, Oak Ridge National Laboratory, and J. E. Christian, Purdue University, discussed a new method for the isotope dilution analysis of chlortetracycline. The polarographic properties of some pyridine derivatives were explained by Nicholas G. Lordi, Rutgers State University.

The effects of corticosteroids and tranquilizers on experimental ameobiasis were discussed by James Ingalls, Long Island University. Lee H. MacDonald, The Upjohn Company, described comparative testing of preservative systems. Other papers presented before the first session were Comparative Pharmacology of Diphenylmethane Derivatives; Modification of the Action of Chloral Hydrate in Mice by the Prior Administration of Nicotinamide; Facilitation of Metrazol-induced Seizures by Iproniazid; Structural Consideration of Steroid Borates; The Effects of Ultrasound on the Production of Microcrystalline Progesterone, and Evaluative Procedures for Film-forming Materials Used in Pharmaceutical Applications. These papers were presented by Arlan G. Roberts, J. B. Roerig and Co., Robert G. Brown, University of Texas; Albert M. Ellman, Rutgers State University; George M. Sieger, Lederle Laboratories; Donald M. Skauen, University of Connecticut; and Joseph L. Kanig, Columbia University, respectively.

Lee H. MacDonald, Upjohn Company, opened the second contributed paper session and presided over the meeting. The papers presented were as follows: A Discussion of the Electro-magnetic Wave Theory; A Comparison of Operating Characteristics of a Liquid and Plastic Scintillator; Sterilization of Regenerated Collagen with Beta-propiolactone; Re-evaluation of Certain Atomic Refractions; Growth of Medicinal Plants in Culture; Description of a Volatile Oil Obtained from a Plant Indigenous to Louisiana; A Continuous Practical Method for Production Granulation; Binding of Cations and Anions by a Nonionic Surface Active Agent; A Technique for Studying Thermally Induced Phase Transitions; and The Synthesis of 2-methyl-2-phenyl-3-(Dialkylaminoalkyl) Benzothiazolines and 2,2,-dimethyl-3-(Dialkylaminoalkyl) Benzothiazolines as Potential Tranquilizers. These papers were presented by Harry Lobel, Nebraska Iowa Electrical Council; George Foster, Purdue University; Edwin L. Ball, Lederle Laboratories; P. J. Jannke, University of Connecticut; A. E. Demaggio, Rutgers State University; John T. Goorley, Northeast Louisiana State College, E. T. Martin, Merck, Sharp and Dohme Research Laboratories; P. P. DeLuca; Temple University; D. R. Reese, Smith, Kline and French Laboratories; and C. S. Davis, Purdue University.

News

Flack Named Whitney Award Recipient

Herbert L. Flack

Mr. Herbert L. Flack, Assistant Director, Jefferson Medical College Hospital and Assistant Professor of Hospital Pharmacy at the Philadelphia College of Pharmacy and Science, has been named the 1961 recipient of the Harvey A. K. Whitney Lecture Award. This Award, established in 1950 by the Michigan Society of Hospital Pharmacists, is presented annually to an individual who has made outstanding contributions to American hospital pharmacy. The Whitney Lecture Award also honors the first Chairman of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, Mr. Harvey A. K. Whitney, who was active for many years in hospital pharmacy organizations and was largely responsible for creation of the ASHP.

Mr. Flack, a charter member of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, has taken an active part in the SOCIETY's activities since its organization in 1942. He was president of the ASHP during the 1949-1950 term and has served the organization in numerous official capacities. In addition to his work in the SOCIETY, he has actively participated in local and state pharmaceutical organizations. His work in the ASHP over the past 14 years shows his conscientious and continuous efforts on behalf of hospital pharmacy. He participated in the first Institute on Hospital Pharmacy which was held in Ann Arbor, Michigan in 1946. He has subsequently served as a faculty member on a number of institute programs.

Mr. Flack has only recently been named to his present position. For the past 18 years he has served as Director of Pharmacy Service at Jefferson Medical College Hospital. Among his outstanding contributions to hospital pharmacy has been his work in recruiting and training young people for hospital pharmacy practice. As director of the program in hospital pharmacy administration offered in cooperation with the Philadelphia College of Pharmacy and Science, he has been a preceptor for more than forty pharmacists now practicing in hospitals throughout the States. He pioneered formal standards and an accreditation program for pharmacy internship and residency programs in hospitals. Closely allied to this work are his contributions to the teaching manuals on "Experience Record for Hospital Pharmacy Internship or Residency," and "Equipment and Supply Lists for Hospital Pharmacists," both of which he co-authored.

Prior to his accepting a position at Jefferson Medical College Hospital in 1946, he served a period in the U. S. Army during which time he was stationed in the Philippines and Japan. He had previously served an internship in pharmacy at the New York Hospital-Cornell Medical Center in New York City where he later became Assistant Apothecary-in-Chief.

Mr. Flack is a graduate of the Philadelphia College of Pharmacy and Science and also holds a Master of Science Degree from that institution. He is a son of a pharmacist, also graduated from PCP&S. Mr. Flack had early experience in retail pharmacies in Philadelphia and in Pitman, New Jersey. At the Philadelphia College, he worked as a laboratory assistant for Dr. Linwood F. Tice, now Dean of Pharmacy at PCP&S. As a student, he also worked part-time at the pharmacy at the Jefferson Medical College Hospital. On graduating, he received high honors and several awards.

Mr. Flack's contributions to the literature of hospital pharmacy and as a speaker for various groups, have been prolific. He served as an assistant editor of THE BULLETIN OF THE AMERICAN SOCIETY OF HOSPITAL PHARMACISTS (now the AMERICAN JOURNAL OF HOSPITAL PHARMACY) and he was also Hospital Pharmacy Forum Editor of the *American Professional Pharmacist* for several years. He has served on the editorial staff of the textbook, *Remington's Practice of Pharmacy* during publication of the Ninth, Tenth, Eleventh, and Twelfth Editions.

At the present time Mr. Flack is serving as a member of the Policy Committee of the Division of Hospital Pharmacy, as Chairman of the Board of Directors of the Eastern Pennsylvania Hospital Pharmacists Association, and Vice-Chairman of the Pennsylvania Hospital Pharmacy Council. Mr. Flack is married and has two children. The family resides in Wayne, Pennsylvania where Mr. Flack is active in community activities.

The Whitney Award presentation will be made in conjunction with the Lecture to be presented by Mr. Flack at a testimonial dinner scheduled for Tuesday, April 25. The dinner honoring Mr. Flack is being held in conjunction with the Annual Meeting of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS and the Convention of the American Pharmaceutical Association in Chicago.

► THE CATHOLIC HOSPITAL ASSOCIATION will hold its 1961 Annual Convention at Cobo Hall, Detroit, June 12-15. "Attitudes-Action-Achievements" will be the theme for the convention program.

Congress of Pharmaceutical Sciences

The 21st International Congress of Pharmaceutical Sciences will be held in Pisa, Italy from September 4 to 8, 1961. The Congress is sponsored every other year by the Scientific Section of the International Pharmaceutical Association.

In outlining the program for this Congress, plans have been made to discuss various aspects of suspensions and emulsions of pharmaceutical interest and to offer experts in pharmaceutical science the possibility of exchanging information on the results of their research work. The program therfore includes a Symposium on "Suspension, Emulsions and Foams in Pharmacy," and an opportunity to discuss free communications in the following sections:

I. Pharmacognosy and Medicinal Plants.
II. Pharmaceutical Chemistry and Analysis of Medicaments.
III. Biological Chemistry, Toxicological and Food Chemistry.
IV. Galenic Pharmacy and Pharmaceutical Technology.
V. Pharmacodynamics, Biological and Microbiological Determinations.

The provisional program is as follows:

Sunday, September 3

3:30 P.M.—Joint Session of the Steering Committee of the F.I.P. Scientific Section and the Organizing Committee.
9:00 P.M.—Assembly and Welcome to the Participants.

Monday, September 4

9:15 A.M.—Opening Session.
10:00 A.M.—1st Lecture of Symposium: "Structure et stabilite des emulsions." (Prof. Dr. M. Guillot, Paris)
11:00 A.M.—2nd Lecture of Symposium: "La constitution et la stabilite des mousses." (Prof. Dr. R. Ruyssen, Gand)
3:30 P.M.—Centenary Celebrations of the Foundation of the: "Bollettino Chimico Farmaceutico."
4:30 P.M.—Discussion on the 1st and 2nd Lectures of Symposium.

Tuesday, September 5

9:00 A.M.—3rd Lecture of Symposium: "Suspensions in Pharmaceutical Practice." (Mr. J. Polderman, Pharm., Oss. Holland)
10:00-5:15 P.M.—Communications in the Different Sections.
5:15 P.M.—Private Meeting of the F.I.P. Scientific Section.
7:00 P.M.—Official Dinner.

Wednesday, September 6

9:00 A.M.—4th Lecture of Symposium: "Emulsions en Pharmacie: Applications Pratiques." (Prof. Dr. U. Gallo, Milano)
10:00 A.M.—5th Lecture of Symposium: "Aerosols en Pharmacie." (Prof. Dr. D. Cavanna, Torino)
11:00 A.M.-5:00 P.M.—Communications in the Different Sections.
5:00 P.M.—Discussion on the 3rd, 4th and 5th Lectures of Symposium.

Thursday, September 7

8:30 A.M.—Communications in the Different Sections.
10:30 A.M.—General Discussion on the Theme of the Symposium.
12:00 Noon—Final Session of the Congress.
5:00 P.M.—Meeting of the Steering Committee of the F.I.P. Scientific Section.
9:00 P.M.—Theatre Performance.

Friday, September 8

8:30 A.M.—Scientific and Pharmaco-botanic Excursion. Visit to Industrial Firms.
12:00 Noon—Lunch.

Included also during the week's Conference will be a program of various events for ladies attending the Congress and special excursions to Florence and other nearby places can be arranged.

Those planning to attend are asked to make application as early as possible so that the Organizing Committee can send further information concerning admission to the Congress and registration of communications in the five sections. Further information and the necessary application forms can be obtained from either the General Secretary, Prof. Dott. A. E. Vitolo or Prof. Dr. R. De Fazi, Chairman of the Organizing Committee, both located at Piazza Carrara, 10, Pisa, Italy.

► THE 1961 BRITISH PHARMACEUTICAL CONFERENCE will be held in Portsmouth, September 18-22. The usual Science Sessions will be held for the presentation of papers dealing with original work on subjects of pharmaceutical interest.

► Pharmacists at Rochester Methodist Hospital in Rochester, Minnesota were hosts to the senior class of the College of Pharmacy at the University of Minnesota on their second annual visit to Rochester on January 19, 1961. In the morning, Neal Schwartau, chief pharmacist at Methodist Hospital, presented two lectures—one on the specialty of hospital pharmacy and another on procedures for handling medications in hospitals. The class then toured the dispensing, manufacturing, and sterile solutions sections of the pharmacy and the special observation unit at Methodist Hospital.

At the noon luncheon, a physician, an administrator and a nurse spoke on the role of pharmacy in a hospital from their respective viewpoints. In the afternoon, the class toured the Mayo Clinic, Weber and Judd Clinic Drug Store and St. Mary's Hospital.

Local arrangements were made by Earl A. Schwerman, assistant chief pharmacist at Methodist Hospital.

News

Hospital Pharmacists Named in National Pharmacy Week Competition

Joseph H. Beckerman, chief pharmacist at the University of California Hospital, U. C. L. A. Medical Center, Los Angeles, has been named the recipient of the first place plaque in the A.Ph.A.'s Hospitals and Clinics Division of the 1960 National Pharmacy Week Display Contest. The Display Contest is one of the highlights of the annual National Pharmacy Week observances and pharmacists are urged to prepare displays for retail pharmacies, pharmacy colleges, public exhibits, and hospitals and clinics. The contest is promoted through the A.Ph.A.'s Committee on Public Relations headed by J. Warren Lansdowne.

Mr. Beckerman's first place display pictorially contrasted pharmacy and medications of the early days with the modern facilities and potent drugs of today. Other hospital pharmacists to receive certificates of merit for second and third place displays will be Mrs. Jane L. Rogan, Evangelical Deaconess Hospital, Detroit, Michigan and to Robert V. Marraro, 3535 USAF Hospital, Mather Air Force Base, California.

Others receiving first place awards include Wayne W. Gordon of Capital Drug Store, Salem, Oregon in the retail pharmacies group; the Fresno-Madera County (California) A.Ph.A. Branch in public exhibits; the Student A.Ph.A. Branch of Ohio State University College of Pharmacy, Columbus, Ohio in pharmacy colleges. The awards will be presented to the winners at the A.Ph.A. Annual Convention being held in Chicago, April 23-28.

► JOHN AUTIAN PH.D., has been appointed as a consultant to the Pharmacy Department of The Clinical Center, National Institutes of Health. He will advise the Pharmacy Department concerning various plastics, their toxicities, and reaction with drugs or other patient supplies. Dr. Autian is an assistant professor at the University of Texas and in charge of a newly created Plastics Laboratory.

► ASHP SECRETARY JOSEPH A. ODDIS participated in a discussion on the "Hospital Formulary System," at the 1961 Mid-Year Conference of Presidents and Secretaries of the American Hospital Association. Others participating in this discussion included Frederick N. Elliott, Department of Professional Services, American Hospital Association, Austin Smith, president, Pharmaceutical Manufacturers Association, Washington, D. C., and Arthur A. Bernstein, staff attorney, American Hospital Association, Chicago.

► THE FIRST ANNUAL CONFERENCE on Pharmaceutical Analysis has been announced by the University of Wisconsin Extension Services in Pharmacy. The Conference, scheduled September 17-20, 1961, will include sessions on administrative aspects of pharmaceutical analysis and control, and a symposia on fluorometric and gas chromotographic analysis from theoretical and applied aspects. The meeting will be held at King's Gateway, Land O'Lakes, Wisconsin and registration can be made through the University of Wisconsin.

SELECTED PHARMACEUTICAL ABSTRACTS

and summaries of other articles interesting to hospital pharmacists

edited by NORMAN HO

COLOR FADING BY SURFACTANTS

Accelerated Color Loss of Certified Dyes in the Presence of Nonionic Surfactants, Scott, M. W., Goudie, A. J., and Huetteman, A. J., J. Am. Pharm. Assoc., Sci. Ed. 49:467 (July) 1960, (Johnson and Johnson Research, New Brunswick, N. J.)

An investigation has been performed to test the suggestion that nonionic surfactants may accelerate the rate of fading in products containing certified dyes. Six dyes, (F.D.&C. Red No. 1, Blue No. 2, Red No. 4, Green No. 1, Yellow No. 5, and Orange No. 3) and five commercially available surfactants (Tween 20, Igepal CA-710, Pluronic F-68, Myrj 52, and Brij 35) were included in the study. The dyes and surfactants were studied at concentrations of 0.001% and 1.0%, since these compounds are commonly employed in similar concentrations in many formulations. Samples were packaged in 50 ml. volumetric flasks and stored in the dark at 48.8°C. for 14 days. The visible absorption spectra for the initial and aged samples was obtained with a Beckman model DK-1 recording spectrophotometer. Results showed that in all but 4 of the 30 systems examined, accelerated fading was noted over that obtained with the dye alone. In general, F.D.&C. Blue No. 2 appeared most sensitive to the action of the surfactants, while Tween 20 and Myrj 52 produced the most dramatic effects on dye stability.

LAWRENCE J. RASERO, JR.

INACTIVATION OF GERMICIDES

Interaction of Preservatives with Macromolecules IV., Binding of Quaternary Ammonium Compounds by Nonionic Agents, DeLuca, P. P., and Kostenbauder, H. B., J. Am. Pharm. Assoc., Sci. Ed., 49:430 (July) 1960, (School of Pharmacy, Temple University, Philadelphia, Pa.)

An investigation has been undertaken to obtain quantitative data for the degree of binding of several cationic agents by some typical nonionics and to compare the degree of binding with the degree of inactivation of the cationics. Equilibrium dialysis studies utilizing a semipermeable nylon membrane indicate a high degree of association and accompanying inactivation of quaternary ammonium germicides in the presence of nonionic surface-active agents. In 1% aqueous solutions of Tween 80, approximately 95% of the total cetylpyridinium chloride or about 50% of the total benzalkonium chloride present would be bound to the Tween and thus inactivated. Methylcellulose was found to interact significantly with cetylpyridinium chloride, but not with benzalkonium chloride. Polyvinylpyrrolidone and Polyox were not found to interact with these cationics. These studies indicate that it is not justifiable to assume that nonionic agents are always compatible with cationic and anionic drugs.

LAWRENCE J. RASERO, JR.

PHARMACEUTICS OF UREA

Some Pharmaceutical Observations on a New Use for Urea—Part 2 and 3, Sutaria, R., B. Pharm., M.P.S., and Williams, F. H., F.P.S., D.B.A., Public Pharmacist, 17:225 (Aug.) 1960 and 17:281 (Oct.) 1960. (Old Church Hospital, Romford, England.)

The clinical use of urea by intravenous injection prompted this hospital pharmacist to attempt to develop a stable preparation. Urea is decomposed readily by temperatures over 135°, and is hydrolyzed slowly by water. Kjeldahl nitrogen determination does not show the form in which the nitrogen content is present. It is necessary to correct for the presence of decomposition products by titrating directly with acid. Experiments show that (1) autoclaving is more destructive than steaming; (2) the higher the concentration of urea in solution, the greater the concentration of decomposition products, but the lesser the percentage of decomposition of urea; (3) the addition of carbon dioxide increases decomposition; (4) partially filled ampuls show less decomposition than those normally filled. Decomposition upon storage increases with temperature and concentration.

Sterility of dry crystalline urea was not achieved by either the use of ultraviolet radiation or washing with ether. Dry sterile preparations may be prepared by first sterilizing a solution by filtration or by autoclaving, then drying under vacuum at 100°. Best results are obtained by the use of a concentrated solution to retard decomposition and to shorten drying time, and also since the dose administered is very large. Allowance must be made for loss during autoclaving, and presence of cyanate which may be formed must be checked. Cyanate is toxic, and other ammonium salts which may be formed may also possibly have some deleterious effect.

Several formulations prepared compared favorably in terms of titratable alkalinity and pH values with a proprietary brand of the same composition, which was prepared by freeze-drying. The actual formulation used is prepared as follows: sucrose 760 Gm., N/1 HCl 1 ml., water for injection to make 1000 ml. is filtered, 25 ml. into each of 250 ml. flasks, which are then autoclaved, and kept ready for use. Freshly made solution of urea 60 Gm., water for injection to 175 ml., sterilized by filtration, is aseptically transferred to flask: the resulting solution is 200 ml. of 30% urea in 10% invert sugar.

CHARLES J. HARTLEIB

GAS STERILIZATION

Gas Sterilization, Perkins, John J., Drug and Cosmetic Industry 87:178 (Aug.) 1960. (Mr. Perkins is vice-president of Research and Development for the American Sterilizer Company, Erie, Pa.)

The use of ethylene oxide mixtures as gas sterilizing agents is increasing. This is being prompted by the use of many products and containers, particularly those made of plastic, which cannot be sterilized by the steam under pressure method. The use of gas sterilization avoids the damage caused by steam and has the advantages of good penetration of materials and the fact that it needs no drying after sterilization. Ethylene oxide gas mixtures are supplied in 10 to 20% concentrations with carbon dioxide or halogenated hydrocarbons. The ideal characteristics of a gas sterilant are stated as noncorrosive, nondeleterious to materials, penetrative, residual easily removed by aeration, rapid in action, low toxicity, nonflammable, nonexplosive, convenient to store, easy to handle, readily available commercially, inexpensive, bactericidal, sporicidal, virucidal and fungicidal at ordinary atmospheric conditions. Gas sterilization efficiency depends on concentration, exposure time, temperature and humidity. Generally times of from 2 to 4 hours are suggested. Gas sterilizers in combination with steam or separately without steam are available in a large variety of styles and sizes from several manufacturers. Though more expensive per sterilizer load than steam, there are other factors mentioned which may make gas sterilization the preferred method for many operations. The author describes the process of one manufacturer in the preparation of a sterile ophthalmic solution. The change from a glass bottle with a rubber-plastic-glass dropper to a flexible plastic bottle with a self-contained dropper tip was made. This operation proved economical to the manufacturer. The author gives a table showing the costs and conditions applicable to various sizes of sterilizers using three commercially available ethylene oxide mixtures.

LEONARD C. SISK

DRUG TERMINOLOGY

Multiplicity and Complexity of Drug Terminology, an editorial, J. Am. Med. Assoc. 174:1630 (Nov. 19) 1960.

Distinctive names are essential for the identification of nearly everything with which modern society is concerned. The lack of distinctive names is most obvious in drug nomenclature where a multiplicity of names prevails. Even pure chemicals being used therapeutically have at least three names: (1) a precise chemical designation which may vary with the system of chemical nomenclature; (2) a nonproprietary name; (3) a proprietary name. Additionally many reports in the literature regarding investigational drugs use initials, abbreviations or numbers to refer to the tested product. For products not a specific

chemical, various descriptive phrases are used. Each of the three types of names, *i.e.* specific name or description, nonproprietary name and proprietary name, has its use. Much of the current confusion in drug terminology is occasioned by a lack of uniformity in its application by manufacturers, investigators and editors of reports published in the medical literature. Preferably a nonproprietary identification using short, pronounceable standardized designations should be used in medical writing and speaking and on drug labels. Currently proprietary products include some sort of nonproprietary name along with their trade name. The multiplicity of trade names for the same product by different manufacturers as well as a variety of names for the different dosage forms of the same drug by the same manufacturer has compounded the confusion in drug terminology. The author suggests rapid adoption of a nonproprietary name for each new product. This could be done by a recognized responsible agency such as the A.M.A. Council on Drugs or the World Health Organization. Editors of medical publications should give adequate display to this nonproprietary name in the titles and texts of all published reports on drugs. Trade names should be shown secondarily for identification. Chemical names should generally be restricted to reference works. The A.M.A. Council on Drugs is currently following such a policy, using nonproprietary terminology with the U. S. trade names given the first time a drug is mentioned.

LEONARD C. SISK

ASPIRIN SOLUTIONS

A Note on the Stability of Aspirin in Solution, Bolton, Sanford, Drug Standards 28:117 (Sept.-Oct.) 1960. (University of Rhode Island, Kingston, R. I.)

A kinetic study of the hydrolytic rate of decomposition of aspirin in the presence of various additives such as citrate, phosphate, acetate, and sodium hydroxide indicates that the rate of decomposition is independent of the nature and concentration of the additive at a given pH.

The solutions of aspirin studied were analyzed spectrophotometrically at various time intervals and half-lives determined at various known pH values and molecular concentrations of additives and aspirin. Although the pH of the aspirin solution is the major consideration in determining the rate of hydrolysis, increased concentrations of buffer salts may increase the rate to a very slight extent. A solution containing both sodium citrate and phosphate increased the degradation rate above that of the solutions containing each salt alone. The rate of hydrolysis at a pH above 6 was slightly higher than that in solutions of lower pH. The half-life in hours of the solutions studied were from 31¼ hours (citrate plus phosphate) to 42 hours for sodium citrate (0.184 molar at pH 3.92) using a 0.055 molar concentration of aspirin.

PAUL J. PIERPAOLI

HYDROGEN PEROXIDE FORMATION IN OINTMENTS

Hydrogen Peroxide Formation by Zinc in Ointments, Lozada, H. A., and Guth, E. P., Drug Standards 28:73 (May-June) 1960. (College of Pharmacy, Ohio State University, Columbus, Ohio).

Zinc oxide acts catalytically in the photochemical formation of hydrogen peroxide. The reaction is also observed to occur in ointments in which the combination of zinc oxide, water and oxygen are present. Irradiation of several common ointment bases of different properties, containing zinc oxide, produced varying concentrations of hydrogen peroxide. An increase in temperature or in duration of irradiation accelerated the reaction. The peroxide produced is capable of attacking oxidizable constituents such as cholesterol, itself being destroyed, and therefore not determinable, although produced.

CHARLES J. HARTLEIB

ASSAY OF PARA-AMINOSALICYLIC ACID

A Note on the Quantitative Ion Exchange Chromatographic Separation and Determination of Para-Aminosalicylic Acid, Lach, J. L., and Cohen, J., Drug Standards 28:65 (May-June), 1960. (College of Pharmacy, State University of Iowa, Iowa City, Ia.).

The assay of PAS has been a problem because metaaminophenol (MAP), a decomposition product, interferes with the direct determination of PAS. Various methods of assay for both PAS and MAP have been reported; most have been unsuccessful in obtaining reproducible results. Differences in acidity of the two substances allowed the use of ion exchange chromatography. Amberlite 1R-4B satisfactorily separated the two substances which were quantitatively recovered as determined by spectrophotometric measurement. Results for several determinations were within 2-3%.

CHARLES J. HARTLEIB

ANALYSIS BY INFRARED SPECTOPHOTOMETRY

Analysis of Crude Drugs by Infrared Spectrophotometry, Fujita, Mitiiti, and Nagasawa, Motoo, J. Pharm. Soc. Japan 80:598 (May) 1960. (Faculty of Pharmaceutical Sciences, University of Tokyo and Pharmaceutical Faculty, Meijo University.)

It was found possible to distinguish between four kinds of crude drugs containing anethole, fennel, sweet fennel, anise, and star anise from their essential oils, using infrared absorption spectra. For this purpose, anethole content and difference in coexisting components were spectrally analyzed. For the determination of anethole, characteristic absorption of a propenyl group at 961 $cm.^{-1}$ was used. In fennel, characteristic absorption of fenchone at 1743 $cm.^{-1}$ was used. For discrimination of anise and star anise oils, differential method was used and a good result was obtained by the use of absorption at 1371 $cm.^{-1}$, appearing stronger in star anise oil. This absorption was considered to be due to the concerted effect of isopropyl group in cineol, terpineol, and phellandrene.

AUTHOR'S SUMMARY

STABILITY OF VITAMIN A ESTERS

Effects of Fatty Acids on Vitamin A Esters in Isopropanol Solutions, Forlano, A. J., and Loyd, E. H., J. Am. Pharm. Assoc., Sci. Ed., 49:451 (July) 1960, (College of Pharmacy, Ohio State University, Columbus 10, Ohio.)

A study was undertaken to determine whether fatty acids caused the instability of vitamin A ester in vanishing creams containing stearic acid, and to determine the nature of the decomposition. The results indicated that (a) the principal methods of degradation are oxidation and elimination in hydroxylated solvents, (b) water increases the rates of elimination, (c) fatty acids decrease the rate of elimination, and (d) oxidation is the main route of decomposition in hydrocarbon solvents. The stabilizing action of the fatty acids appears to be due to a regeneration of the ester in anhydrous solvents and a mixture of vitamin A alcohol and ester in hydroalcoholic media. There appears to be a definite need for antioxidants in vitamin A solutions.

LAWRENCE J. RASERO, JR.

CURRENT LITERATURE

. . . also calling your attention to the following articles appearing in recent hospital and pharmaceutical journals

. . . . . .

ADMINISTRATION

—Purchasing

McWhorter, R. Clayton: Purchase Order Number System, *Am. Profess. Pharmacist* 26:780 (Dec.) 1960.

EDUCATION AND TRAINING

Yagi, Phyllis: Interneship Program at Women's College Hospital (Toronto), *Hosp. Pharm.* (Canada) 13:253 (Nov.-Dec.) 1960.

HISTORY

Zugich, John J.: Hospital Pharmacy in Review 1947-1960, *Am. Profess. Pharmacist* 26:776 (Dec.) 1960.

LIBRARY AND REFERENCE

Allen, F. A. D.: The Filing of Technical Literature—1, *Public Pharm.* (Great Britain) 17:333 (Dec.) 1960.

PHARMACY AND THERAPEUTICS COMMITTEE

Bowles, Grover C., Jr.: Physician, Nurse and Pharmacist Need to Understand Stop Order, *Modern Hosp.* 96:92 (Jan.) 1961.

Lovell, Russell: How a Pharmacy and Therapeutics Committee Improves Pharmacy Service, *Hospitals* 34:71 (Dec. 1) 1960.

POISON CONTROL

Christian, Joseph R.: Antidote Supplies for the Emergency Room, *Hosp. Management* 91:69 (Feb.) 1961. (Similar article by same author appeared also in *Hosp. Topics* 11:59 (Nov.) 1960.)

STATISTICS

Buchko, Orest: Collecting and Using Data, *Hosp. Pharm.* (Canada) 13:251 (Nov.-Dec.) 1960.

DRUG EVALUATIONS

by the Council on Drugs of the American Medical Association

► DRUG EVALUATIONS as published by the Council on Drugs of the American Medical Association have been reprinted in the AMERICAN JOURNAL OF HOSPITAL PHARMACY regularly. In accordance with an editorial in the December 17 (1960) issue of the *Journal of the American Medical Association 174*:2066, the column formerly known as "New and Nonofficial Drugs" has been replaced by a new column under the name "New Drugs and Developments in Therapeutics." In this, a digest of monographs and drug evaluations will appear.

The monographs will continue to be made available and will be cumulated to appear in the Council's annual publication, *New and Nonofficial Drugs*. For the information of hospital pharmacists, reports made available by the A.M.A.'s Council on Drugs will continue to be published in this column.

The index listed below is included here for reference. It contains reference to those drugs published in the *J. Am. Med. Assoc.* between October 24, 1959 and December 17, 1960. The monographs were reprinted in THIS JOURNAL between February 1960 and January 1961.

Index

TO EVALUATED DRUGS AND ARTICLES IN THE FEBRUARY, MARCH, APRIL, MAY, JUNE, JULY, AUGUST, OCTOBER, NOVEMBER AND DECEMBER (1960) AND JANUARY (1961) ISSUES OF THE AMERICAN JOURNAL OF HOSPITAL PHARMACY.

The New York Hospital Formulary -- A Venerable American Institution

Editorial from Journal of the American Medical Association

► LISTS OF DRUGS with thumbnail descriptions, more portentously called monographs, have long been used in American medicine. There seems to be a need for them; many have appeared from time to time and many more are now available. There are the carefully prepared and selected official reference lists with national application and legal or quasi-legal status: the Pharmacopoeia of the United States, the National Formulary, and New and Nonofficial Drugs. Then there are the non-discriminating lists compiled with widely disparate editorial standards, orientation, and audience appeal: the truly encyclopedic Merck Index, the American Drug Index, Drugs in Current Use, The Physician's Desk Reference, The Modern Drug Encyclopedia, Pharm-Index, and many others. Finally there is the special group of drug lists based on a parochial type of editorial purpose: the hospital formularies.

The first group, the official lists, sets pharmaceutical standards for meticulously selected, effective, and well-established drugs. The second, the non-discriminating lists, serves only to identify in varying detail and with varying bias the drugs currently on the market. The third, the highly selective hospital formulary, is a self-governing device which applies specifically to the therapeutic practices of a circumscribed professional group. However, since it may sometimes be used by outsiders, it also influences the therapies of a larger professional community.

This is a particularly appropriate time to raise the matter, for the latest edition of The New York Hospital Formulary, which, under the title of Pharmacopoeia Nosocomii Neo-Eboracensis, established the hospital formulary system in this country in 1816, has just been published. It is not generally known that this list of drugs and standards also antedated the first Pharmacopoeia of the United States by four years. Yet only the language and the names of the drugs have changed in 144 years; the purpose and form of The New York Hospital Formulary remain unscathed by the passage of time.

The functions and operation of a hospital formulary may be of some interest, especially to those who do not come under the influence of one. The New York Hospital Formulary, which is both highly selective and effective, provides an example for discussion. It is an instrument of the Medical Board of the Hospital, compiled and edited by its standing committee, the Formulary Committee. Only two of its members are not on the medical staff—a representative of the administration and the Apothecary (a title dating from the charter granted by George III), who acts as secretary. Representatives of the major services and specialties of the Hospital and of the Pharmacology Department of the Cornell University Medical College comprise the rest of the committee which is governed by standard parliamentary procedure.

The sole purpose and function of The New York Hospital Formulary is to inform the Hospital regarding the best possible therapy for the patients in its pavilions and out-patient services—best in terms of therapeutic agents available as well as in the way they are administered. The Formulary Committee attempts to keep the therapeutic practices of the hospital as effective and up-to-date as is consistent with safety. It deletes or rejects drugs not to be used; it adds to the Formulary new drugs that it considers desirable. Anyone on the professional staff may request the addition of a drug to the Formulary. The Formulary Committee then considers the application.

The only basis for the addition of a new drug to the Formulary is superiority over other available agents; the only basis for rejection is inferiority or excessive danger. Newness or antiquity do not count. Drugs are not excluded because they will not be used frequently. Cost does not enter into the choice of one drug over another unless it is the majority opinion of the committee that there is no other basis for a decision. The committee often seeks the advice and counsel of experts on the staff of The New York Hospital, Cornell University Medical College, and affiliated institutions, and occasionally of specialists not associated with the institution. Often discussions on a single drug extend over several meetings and involve many consultations. In this laborious way the committee comes to considered decisions on the drugs it includes in its Formulary.

The edition of The New York Hospital Formulary just published contains 359 different drugs (not including reagents, solvents, etc., or mixtures or special preparations of drugs already enumerated). The pharmacy of a hospital which does not have this form of control may stock 2,500 drugs in 10,000 different forms. In the opinion of The New York Hospital Formulary Committee and Medical Board, its Formulary prepares the Hospital in every way for the treatment of all disease, no matter how uncommon. However, should an attending physician decide that there is a need for a nonformulary drug for a service patient, it will be promptly purchased for him on request. Private patients receive all the drugs prescribed for them by their private physicians. Should they be nonformulary drugs, they are purchased from an outside pharmacy and charged to the patient. Thus every provision is made to insure the best therapy for all patients; no one can be deprived of a drug he needs. Surely every hospital has the same goal.

The New York Hospital Formulary is also an effective educational instrument. It provides the medical students of the Cornell University Medical College with a meticulously thought out list of drugs, each of which is described in a carefully and concisely written monograph *(sic)*, in which its actions are listed, its uses indicated and its limitations and dangers emphasized. It presents the staff and the medical students, in a compact format, with the distilled opinions of the professional services of the hospital. It serves as a therapeutic guide and sets high standards of therapy for the professional staff and students. In the past it has also been used by many others. Over 4,500 copies of the last edition were sold outside the hospital. Unfortunately, the current edition will not be available for outside distribution.

Besides providing the best in medication, The New York Hospital Formulary also makes for economy and efficiency in the purchase and handling of drugs. The bill for drugs purchased by The New York Hospital has always been substantial; during 1959 it was $531,427. It is estimated that without the operation of the formulary system the total expenditure for drugs would have been between $250,000 and $500,000 greater. Thus, as a by-product of the formulary system, perhaps half a million dollars were saved. This has gone into patient care. What an *incidental* contribution to the Hospital—to the public!

The formulary system saves this stupendous sum because (1) it reduces the pharmacy inventory; (2) it makes possible the purchase of larger lots of drugs than does a nonformulary system; (3) it facilitates the purchase of drugs with non-proprietary names in a competitive market. How much more the physical operation of the hospital pharmacy would have cost had not the inventory been limited by the decisions of the Formulary Committee cannot be calculated and has not been included in the estimated savings.

The use of non-proprietary names is a fundamental feature of The New York Hospital Formulary. It is the stand of the Medical Board that this is the only system of nomenclature by which pharmacology and therapeutics can be taught, since, above all things, to communicate knowledge one must understand one's subject. Since The New York Hospital is a teaching hospital, the use of non-proprietary names is required by the chiefs of the services. Only non-proprietary names are recognized in prescriptions presented to the hospital pharmacy.

Does this rule risk the use of inferior drugs in The New York Hospital? The Hospital insists on U. S. P. and N. F. standards. The Formulary Committee nevertheless recognizes the importance of purchasing drugs manufactured only by houses whose reputations are impeccable. It inspects the plants it does not already know well. But it does not confuse trade-marks or proprietary names with conscientiousness. The Hospital has never had any diffieulty which could be attributed to the purchase of inferior drugs through the old American system of open competition.

Does this practice of The New York Hospital ever deprive a patent holder of the rights or protection which he has earned and deserves as an inventor? As long as a valid patent exists on a drug which the Hospital purchases, this cannot happen. The Hospital does not purchase from drug counterfeiters. It purchases only through legal channels and therefore pays all royalties required by law and custom. It saves no money by using the nonproprietary name for a drug protected by patent; it does so merely as a matter of operational procedure as well as academic principle.

The aims of the formulary system in The New York Hospital have not changed in 144 years. In 1960, as in 1816, The New York Hospital Formulary serves the Hospital, the professional staff, and, above all, the patients. But the benefits do not stop there. Through the operation of a committee representing the professional staff, the Formulary makes it possible for the Hospital to extend its medical service to the public and to the profession because, in paving the way for the best therapy, by great good fortune the practice also leads to substantial economy and the highest standards in medical teaching. For these reasons the adoption of a hospital formulary is urged by the Joint Commission on Accrediation of Hospitals, which represents The American Hospital Association, The American College of Surgeons, The American College of Physicians, the American Medical Association and the Canadian Medical Association.

J. Am. Med. Assoc. 174:67 (Sept. 3) 1960.

POSITIONS

in hospital pharmacy

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The Personnel Placement Service is operated without charge for the benefit of hospitals and pharmacist members of the American Pharmaceutical Association and the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS. The ultimate purpose is the improvement of pharmaceutical services in hospitals, by more adequately fulfilling hospital pharmacy personnel needs and by locating positions which provide challenging opportunities for pharmacists who have indicated an interest in a hospital career.

By participating in the service, the hospital indicates a desire to achieve a pharmaceutical service which meets the Minimum Standard for Pharmacies in Hospitals. A description of the position should be submitted to the Division of Hospital Pharmacy on the forms provided. The hospital will receive applications directly from the applicant. The hospital agrees to reply to each application received and to notify the Division of Hospital Pharmacy when the position is filled.

The pharmacist, by participating, agrees to submit a Personnel Placement Service Information Form to the Division of Hospital Pharmacy. The applicant will then be notified of openings listed with the Service as they become available and can negotiate directly with the hospital if he is interested. It is agreed that the Division of Hospital Pharmacy will be notified as soon as a position is accepted.

A listing of positions open and wanted will be made regularly in the AMERICAN JOURNAL OF HOSPITAL PHARMACY without charge. Neither the name of the hospital offering the position nor the name of the applicant will be listed, except by code. All inquiries should be directed as shown below, including the code number.

Address all inquiries to
Division of Hospital Pharmacy
2215 Constitution Avenue, N. W.
Washington 7, D.C.

positions open

STAFF PHARMACST—700 bed university teaching hospital. Duties include inpatient and outpatient dispensing. B. S. required. Must be registered or eligible for registration in Wisconsin. Forty hour week, vacations and insurance programs. PO-255

ASST. CHIEF PHARMACIST—317 bed general hospital located in Delaware. Duties include assisting chief pharmacist in carrying out procedures and policies. Male preferred with internship, preferably M. S. degree. Forty hour week, vacation, liberal personnel policies. PO-254

CHIEF PHARMACIST—450 bed general hospital. Duties include supervising the operation of pharmacy dept., serving as secretary of the Pharmacy and Therapeutics Committee, preparing annual budget requests and supervising personnel. Forty hour week, vacation, sick leave, holidays and retirement. California licensure required. PO-253

STAFF AND ASST. CHIEF PHARMACISTS—600 bed general hospital located in suburb of Chicago. Filling patient prescriptions. Forty hour week. Excellent personnel policies. PO-252

REGISTERED PHARMACIST—154 bed general hospital primarily for care of Samoan people. Complete charge. Free medical and hospital care. Ten weeks' paid leave at termination of two year contract. Single person preferred. Send resume, experience, education, availability and salary requirements to: Personnel Officer, Government of American Samoa, Pago Pago, American Samoa.

STAFF OR ASST. CHIEF PHARMACTIST—300 bed general hospital. Duties include compounding, dispensing, assisting in purchasing of supplies, preparing reports, maintaining records, furnishing information on medications to physicians and nurses, and assisting with special duties as assigned by chief pharmacist. Must have B.S. and be eligible for registration in Georgia. Liberal employee benefits. PO-251

STAFF PHARMACIST—237 bed general hospital. Duties include filling patient drug orders, outpatient prescriptions and assisting chief pharmacist. B. S. degree and registration in Iowa required. Forty hour week, vacation, sick leave. PO-250

STAFF PHARMACIST—525 bed general hospital located in Ohio. Duties include filling prescriptions for patients, floor stock and clinic patients. Must be registered in Ohio. Forty hour week, vacation and personnel policies. PO-249

CHIEF PHARMACIST—60 bed general short-term hospital. Pharmacist will be completely responsible for the operation of the pharmacy dept., including purchasing drugs and supplies and the preparation of monthly reports. Will also be responsible for meeting with the pharmacy and therapeutics committee making suggestions and recommendations for pharmacy procedures. Must be registered in California. Liberal personnel policy. PO-248

STAFF PHARMACIST—240 bed general hospital expanding to 300 beds. Male or female. Must be registered in Tennessee. Forty hour week, vacation and liberal benefits. PO-247

STAFF PHARMACIST—700 bed general hospital. Duties include dispensing drugs from the central and clinic pharmacies. Registration in Georgia required. Male or female. Liberal personnel policies. PO-245

STAFF PHARMACIST—275 bed private hospital in Chicago. Applicant will compound and dispense drugs and medicines. Must be licensed in Illinois. Forty hour week, vacation and other liberal benefits. PO-243

STAFF PHARMACIST—520 bed general private hospital. Duties include compounding and dispensing medicines and preparations according to prescription. Female preferred. Must be registered or eligible for registration in Washington State. Forty hour week, vacation and other liberal benefits. PO-242

ASST. CHIEF PHARMACIST—300 bed general hospital located in New Jersey. Duties include dispensing and labeling of drugs, filling prescriptions for inpatients and outpatients, and will be in charge of dept. in chief pharmacist's absence. Male or female. Must be registered or eligible for registration in New Jersey. Forty hour week, vacation, sick leave, holidays and hospitalization. PO-241

ASST. CHIEF PHARMACIST—334 bed general hospital located in Florida. Applicant will assist with the purchasing, receiving and issuing of pharmacy supplies. Will be responsible for the operation of the dept. in chief pharmacist's absence. Must be eligible for registration in Florida. Forty hour week, vacation, holidays, sick days, group hospitalization and insurance benefits. PO-240

CHIEF PHARMACIST—380 bed general hospital located in North Carolina. Applicant will organize department in new institution which will open in February or March, 1961. Hospital pharmacy internship required. Vacation, retirement, and sick leave. PO-239

STAFF PHARMACIST—350 bed general hospital located in Florida. Dispensing patient drug orders and related duties. Must be eligible for registration in Florida. Forty hour week, vacation, holidays, sick days, group insurance and retirement. PO-238

STAFF PHARMACIST—365 bed general hospital. Duties include bulk compounding, sterile solutions and filling outpatient prescriptions. Recent graduate preferred. Must be registered in New York. Forty hour week, vacation, holidays and sick leave. PO-237

ASST. CHIEF PHARMACIST—650 bed general hospital located in Nebraska. Duties include refilling patient orders, floor supplies for nursing stations and compounding supplies. Forty hour week, vacation. PO-236

STAFF PHARMACIST—350 bed general hospital. Applicant will assume some supervisory responsibility. B.S. required. Must be registered or eligible for licensure in Ohio. Forty hour week, vacation, sick leave, holidays and group hospitalization. PO-235

STAFF PHARMACIST—220 bed short-term general hospital located in Indiana. Duties include compounding and filling prescriptions, pricing charge slips, taking inventory of narcotics and alcohols, ordering drugs, recording statistics, and supplying information on drug usage. Forty hour week, vacation, sick leave and employee health program. PO-232

CHIEF PHARMACIST—120 bed general hospital located in Kansas. Pharmacist will organize pharmacy department and assist in teaching pharmacology to student nurses. Must be registered or eligible for licensure. Forty-four hour week, vacation, liberal benefits. PO-230

ASST. CHIEF PHARMACIST—400 bed general hospital. Must be eligible for licensure in Virginia. Forty-four hour week, vacation, liberal benefits. PO-227

STAFF PHARMACIST—550 bed teaching hospital located in Virginia. No experience necessary. Female preferred. Forty hour week, vacation, liberal benefits. PO-226

CHIEF PHARMACIST—General hospital located in West Virginia. Pharmacist will be under direct supervision of the administrator, filling prescriptions and allied duties; planning; organizing; and directing pharmacy and central sterile supply in accordance with established policies. B.S. required. Forty hour week, liberal benefits. PO-225

CHIEF PHARMACIST—100 bed general hospital located in Ohio. Applicant must have organizational ability and will assume administrative responsibilities of the dept. Must be registered. PO-224

CHIEF PHARMACIST—Psychiatric hospital located in Ohio. Must be registered in Ohio. Forty hour week, vacation and retirement benefits. PO-221

STAFF PHARMACIST—400 bed general hospital located in Texas. Duties include dispensing, etc. Applicant must have B.S. and be eligible for registration in Texas. Forty hour week, two week vacation. Write: Pharmacy Department, Harris Hospital, Fort Worth, Texas. PO-219

ASST. CHIEF PHARMACIST—200 bed general hospital located in Connecticut. Duties include filling of medication orders, preparing stock drugs and filling inpatient and outpatient prescriptions. Forty hour week, two weeks vacation and sick leave. PO-218

ASST. CHIEF PHARMACIST—220 bed general hospital. Will be in charge of pharmacy in chief pharmacist's absence. Qualifications: female, B.S., experience in pharmacy administration, licensed in Pennsylvania. Forty hour week, vacation, progressive personnel policy. PO-209

ASST. CHIEF PHARMACIST—500 bed general hospital located in Iowa. Will assist chief pharmacist and will be responsible for the operation of the pharmacy dept. in the absence of the chief pharmacist. Forty hour week, vacation, sick leave and holidays. PO-205

ASST. CHIEF PHARMACIST—238 bed general hospital located in Michigan. Duties include dispensing, controlling pharmacy divisions on nursing units, and assuming responsibility of the pharmacy in absence of chief pharmacist. Forty hour week, vacation, holidays and sick leave. PO-204

ASST. CHIEF PHARMACIST—204 bed hospital. Duties include dispensing, receiving, and labeling drugs, etc.; furnishing information to physicians and nurses; teaching student nurses; and being responsible as an assistant department head in administrative and other related duties. Forty hour week, vacation, insurance, and sick leave. Must be eligible for registration in Illinois. PO-203

CHIEF PHARMACIST—104 bed general hospital. Direct pharmacy with the help of full-time registered nurses and assist in the purchase of medical surgical supplies. Forty hour week, vacation and sick leave. Located in a University town in Illinois. PO-202

STAFF PHARMACIST—280 bed general hospital. Intern and resident program, school of nursing and school of medical technology. Building program to include new pharmacy facilities. Must have B.S. in Pharmacy. Michigan registration required or be eligible for licensure. Recent graduate acceptable. Forty hour week, vacation, insurance, pension plan, holidays and sick leave. PO-199

CHIEF PHARMACIST—300 bed hospital located in Virginia. Pharmacist will have responsibility of organizing dept., purchasing initial stocks, planning policies and procedures, establishing formulary, and serving on Pharmacy and Therapeutics Committee. Forty hour week, vacation, and sick leave. PO-195

STAFF PHARMACIST—790 bed hospital. Duties include handling and filling of inpatient and outpatient departmental orders, outpatient prescriptions and bulk manufacturing. Must be registered or eligible for registration in Ohio. Male preferred. Forty hour week, vacation, holidays, and pension plan. PO-194

ASST. CHIEF PHARMACIST—225 bed general hospital in Hawaii. Assist chief pharmacist, charge of dept. in chief pharmacist's absence, and supervisory responsibility. Must be eligible for licensure in Hawaii. Forty hour week, vacation, holidays, annual sick leave, insurance and retirement plans. PO-191

CHIEF PHARMACIST—2300 bed mental hospital. Pharmacist will have complete charge of pharmacy, drug orders, stocking, dispensing, compounding necessary records, and other pharmacy duties. Must be licensed in Ohio. Forty hour week, vacation, holidays, insurance, retirement plan, and sick leave benefits. PO-189

STAFF PHARMACIST—400 bed general hospital located in Michigan. Excellent opportunity in an expanding pharmacy program. Liberal benefits. PO-185

CHIEF PHARMACIST—264 bed general hospital located in Texas. Plans and directs pharmacy policies, compounds and dispenses medicines, purchases supplies and materials, maintains records, and prepares periodical reports. Must be eligible for or have M.S. Degree. Forty hour week, vacation, retirement, sick leave and insurance plans. PO-177

STAFF PHARMACIST—290 bed general medical and surgical city hospital. Duties include compounding, dispensing, manufacturing, and assisting in the purchasing of supplies. Prepares reports and maintains records. Furnishes information concerning medications to physicians and nurses. In absence of associate pharmacist will assist with special duties as assigned by chief pharmacist. Male or female between 23-45 years of age. Ohio registration required. Hospital pharmacy internship preferable. Forty hour week, vacation, sick leave, retirement plan, credit union, holidays and insurance. PO-170

STAFF PHARMACIST—200 bed general hospital. Duties include compounding, dispensing, and manufacturing. Applicant must have B.S. in Pharmacy and be registered in Connecticut. Recent graduate acceptable. Forty-four hour week, vacation, pension plan and hospitalization. PO-168

STAFF PHARMACIST—100 bed general hospital located in Texas. Assume personal responsibility for accurate filling of prescriptions and supplies, assist in inspecting drugs in nursing stations, replace stock taken from night emergency container, inspect and refill opthalmic solution trays from operation room, emergency room, and central supply. Female preferred. Must be registered or eligible for registration in Texas. Forty hour week, vacation, holidays and sick leave. PO-164

ASST. CHIEF PHARMACIST—280 bed general hospital. Duties include filling prescriptions and medication orders from various units, supervise pharmacy clerks, assume administrative responsibility when chief pharmacist is absent. Forty-four hour week, sick leave and holidays. Must be registered in Illinois. PO-161

STAFF PHARMACIST—Unique, new 400 bed general private hospital where pharmacists join the doctor-nurse team by working in a dispensing unit location on each 100 bed nursing unit or in the central pharmacy. The dispensing unit personnel have responsibility for providnig drugs, oxygen, dressing trays, I.V. solutions and similar items. A total of sixteen staff pharmacists is required to staff the hospital. Applicants must be eligible for registration in California. Excellent opportunity; generous benefits. PO-148

STAFF OR ASST. CHIEF PHARMACIST—150 bed general hospital located in New Mexico. Generous benefits. PO-134

STAFF PHARMACIST—500 bed general hospital located in Oklahoma. B.S. required. Forty hour week. PO-95

ASST. CHIEF PHARMACIST—237 bed general hospital in West Virginia. Female desired. Forty-four hour week, vacation. PO-77

positions wanted

STAFF PHARMACIST—Male, married. B.S. obtained at Texas Southern University, Houston, in 1960. Will locate anywhere. Registered in Texas. PW-298

ASST. CHIEF OR CHIEF PHARMACIST—Female, single. B.S. obtained at the Ohio State University College of Pharmacy in 1954. Five years' hospital pharmacy experience. Prefers to locate in the Midwest or East. Registered in Illinois and Ohio. PW-297

STAFF OR ASST. CHIEF PHARMACIST—Male, married. B.S. obtained in 1952 at Idaho State College. Prefers to locate in California. Registered in Idaho, Utah, Washington, Oregon and California. PW-296

STAFF PHARMACIST—Female, single. B.S. obtained in 1956 at Philadelphia College of Pharmacy and Science. Hospital pharmacy experience. Prefers to locate in the Los Angeles, California area. Registered in Pennsylvania and eligible for registration in California. PW-295

CHIEF PHARMACIST—Male, married. B.S. obtained at the Philadelphia College of Pharmacy and Science in 1951. Nine years hospital pharmacy experience. Prefers to locate in the North, Midwest or in the West. Registered in Pennsylvania and Delaware. PW-294

STAFF OR ASSISTANT CHIEF PHARMACIST—Female, single. Obtained B.S. in 1957 at West Virginia University. Served hospital pharmacy internship. Three years' hospital pharmacy experience. Prefers to locate in the West or South. Registered in West Virginia and Virginia. PW-293

CHIEF PHARMACIST—Male, married. B.S. obtained at the University of Illinois. Extensive hospital pharmacy experience. Presently completing a four-year curriculum in Business Administration at Northwestern University. Prefers to locate in the Chicago, Illinois area. Registered in Ilinois, Arizona, and California. PW-291

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Obtained M.S. at Philadelphia College of Pharmacy. Served hospital pharmacy internship. Three years' hospital pharmacy experience. Prefers to locate in Connecticut. Registered in Connecticut and Pennsylvania. PW-290

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Obtained M. S. in 1958 at the University of Iowa. Served hospital pharmacy internship. Military obligations completed. Hospital pharmacy experience. Prefers to locate in the West. Registered in Colorado and Iowa. PW-289

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. B.S. obtained at University of Illinois. Extensive hopsital pharmacy experience. Prefers to locate in the East or Midwest. Registered in Illinois. PW-287

STAFF OR ASST. CHIEF PHARMACIST—Male, married. Obtained B.S. in 1954 at Rutgers College of Pharmacy. Hospital pharmacy experience. Prefers to locate in Florida. Registered in Florida, New Jersey and New York. PW-286

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. B.S. received at Purdue University in 1944. Served hospital pharmacy internship. Extensive hospital pharmacy experience. Will locate anywhere. Registered in Indiana, Michigan and Wisconsin. PW-285

STAFF OR ASST. CHIEF PHARMACIST—Male, single. Obtained B.S. in 1959 at the University of Colorado. Completed hospital pharmacy internship at Denver General Hospital in June 1960. Prefers to locate in the West or Midwest. Registered in Colorado. PW-284

ASST. CHIEF OR CHIEF PHARMACIST—Female. Obtained B.S. in 1955 at Xavier University. Five years' hospital pharmacy experience. Prefers to locate in the Los Angeles, California area. Registered in Louisiana and Texas. PW-283

ASST. CHIEF OR CHIEF PHARMACIST—Female, married. B. S. obtained in 1954. Six years hospital pharmacy experience. Prefers to locate in New York, New Mexico, Texas and Louisiana. PW-282

CHIEF PHARMACIST—Male, married. Obtained B.S. in 1953 at St. John's College of Pharmacy. Seven years' hospital pharmacy experience. Prefers to locate in the Northeast. Registered in New York and New Jersey. PW-279

ASST. CHIEF OR CHIEF PHARMACIST—Male, maried. Received at Ohio State University B.S. Degree in Biology in 1952 and B.S. Degree in Pharmacy in 1955. Five years' hospital pharmacy experience. Willing to locate in the Eastern, Northern or Western part of the country. Registered in Ohio. PW-277

ASST. CHIEF OR CHIEF PHARMACIST—Female, single, B.S. obtained in 1956 at the University of Wyoming. Completion of work for M.S. Degree expected fall of 1960 at the University of Maryland. Served hospital pharmacy internship. Hospital pharmacy experience. Prefers to locate in the West. Registered in Wyoming. PW-276

STAFF OR ASST. CHIEF PHARMACIST—Female, married. B.S. obtained in 1954 at St. Louis College of Pharmacy. Six years' hospital pharmacy experience. Prefers the Northwestern part of the country, but willing to locate anywhere. Registered in Missouri. PW-275

CHIEF PHARMACIST—Male, married. Obtained M.S. in Hospital Pharmacy in 1954 at the University of Southern California. Served hospital pharmacy internship. Eight years' hospital pharmacy experience. Prefers to locate in the Northeastern part of the country. Registered in New York, New Jersey and California. PW-274

CHIEF PHARMACIST—Male, married. Received B. S. Degree in 1957 at Purdue University. Two years' hospital pharmacy experience. Military obligations completed. Prefers to locate in the Southeastern part of the country. Registered in Indiana and Illinois. PW-272

ASST. CHIEF OR CHIEF PHARMACIST—Male, single. M. S. obtained in 1958 at the University of Texas. Served hospital pharmacy internship. Hospital pharmacy experience. Prefers to locate in the Southwest. Registered in Kansas and Texas. PW-270

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. B.S. obtained in 1955 at the University of Nebraska. Five years' hospital pharmacy experience. Prefers to locate in California. Registered in Nebraska and California. PW-269

ASST. CHIEF OR CHIEF PHARMACIST—Female, single. B. S. Degree. Fifteen years' administrative and practical experience in hospital pharmacy Prefers Midwest, particularly Illinois or Wisconsin. Registered in Virginia, Illinois, Wisconsin and Michigan. PW-268

CHIEF PHARMACIST—Male, single. Obtained M.S. in 1954 at the University of Tennessee. Served hospital pharmacy internship. Six years' hospital pharmacy experience. Prefers to locate in the Southwest or in Florida. Registered in Connecticut and New York. PW-266

CHIEF PHARMACIST—Male, married. M.S. obtained in 1957 at the Nebraska University College of Pharmacy. Served hospital pharmacy internship. Six years' hospital pharmacy experience. Prefers to locate in the West or Midwest. Registered in Colorado, Missouri and Nebraska. PW-265

CHIEF PHARMACIST—Male, married. Obtained M.S. in Hospital Pharmacy at the State University of Iowa in June 1959. Served hospital pharmacy internship. Three years' hospital pharmacy experience. Will locate anywhere. Registered in Illinois. PW-264

CHIEF PHARMACIST—Male, married. B.S. Served hospital pharmacy internship. Extensive hospital pharmacy experience. Prefers to locate in the Midwest. Registered in Ohio. PW-263

CHIEF PHARMACIST—Male, married. B.S. Fourteen years' hospital pharmacy experience. Prefers to locate in the East or Midwest. Registered in Pennsylvania and West Virginia. PW-260

ASST. CHIEF PHARMACIST—Male, single. Obtained B.S. in 1956 at Purdue University. Hospital pharmacy experience. Prefers position with some administrative and/or teaching duties. Would like to locate in Northeast or Southwest section of country. Registered in Texas. PW-256

CHIEF PHARMACIST—Male, single. B.S. obtained in 1952 at the University of Illinois. Served hospital pharmacy internship. Two years' hospital pharmacy experience. Registered in Illinois. Prefers to locate in Arizona. PW-252

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Obtained B.S. in 1954 at South Dakota State College. Two years' hospital pharmacy experience. Will locate anywhere. Registered in South Dakota. PW-247

STAFF PHARMACIST—Male, married. Received B.S. in June 1960 at Philadelphia College of Pharmacy and Science. One year's hospital pharmacy experience. Prefers to locate in Philadelphia. PW-246

DIRECTOR OF PHARMACY SERVICES—Male, single. Received B.S. in in 1956 at the University of California. Served hospital pharmacy internship. Four years' hospital pharmacy experience. Registered in California. Prefers to locate in California. PW-237

PHARMACIST—Female, single. M.S. received at the University of Maryland in 1951. Served hospital pharmacy internship. Five years' hospital pharmacy experience. Prefers to locate in New Jersey. Registered in Pennsylvania and Missouri. PW-225

ASST. CHIEF OR CHIEF PHARMACIST—Male, married B.S. received at Detroit Institute of Technology in 1950. Four years' hospital pharmacy experience. Prefers to locate in Michigan. Registered in Michigan. PW-224

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Received B.S. at Medical College of South Carolina in 1950. Four years' hospital pharmacy experience. Prefers Southeast section of country. Registered in North Carolina and South Carolina. PW-221

STAFF OR CHIEF PHARMACIST—Male, single. B. S. received in 1952 at St. Louis College of Pharmacy. Two years' hospital pharmacy experience. Registered in Missouri. Prefers to locate on the West Coast, particularly California. PW-217

STAFF PHARMACIST—Female, single. B. S. Seven years' hospital pharmacy experience. Southwest section of country preferred. Registered in Alabama and Georgia. PW-199

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. M. S. obtained in 1956 at Columbia University College of Pharmacy. Hospital experience. Prefers to locate in California. Registered in New York, Michigan, New Jersey and Florida. PW-184

ASST. CHIEF OR CHIEF PHARMACIST—Male. B. S. received in 1954. Desires to locate in Michigan, Ohio or Illinois. Registered in Michigan. PW-177

CHIEF PHARMACIST—Male, married. B.S. Ten years' hospital pharmacy experience. Registered in Mass., Ill., Mo., Ky., Tenn., and Va. PW-150

ASST. CHIEF OR CHIEF PHARMACIST—Male, single. Registered in D. C., Ill., Md., and Penna. Graduate University of Pittsburgh in 1953, experience in research. Prefers North and East. PW-148

CHIEF PHARMACIST—Male, married. Graduate of St. Johns University College of Pharmacy. Extensive experience as chief pharmacist and purchasing agent. Prefers to locate in New York or New Jersey. Registered in New York and New Jersey. PW-144

ASST. DIRECTOR OR DIRECTOR OF PHARMACY SERVICES—Male, single. B.S. Retail and five years' hospital experience. Registered in Illinois. PW-119

CHIEF PHARMACIST—Female, single. Registered in Pennsylvania and Ohio. Twelve years' hospital pharmacy experience as a chief pharmacist. Desires to locate in Pennsylvania or Ohio. PW-111

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